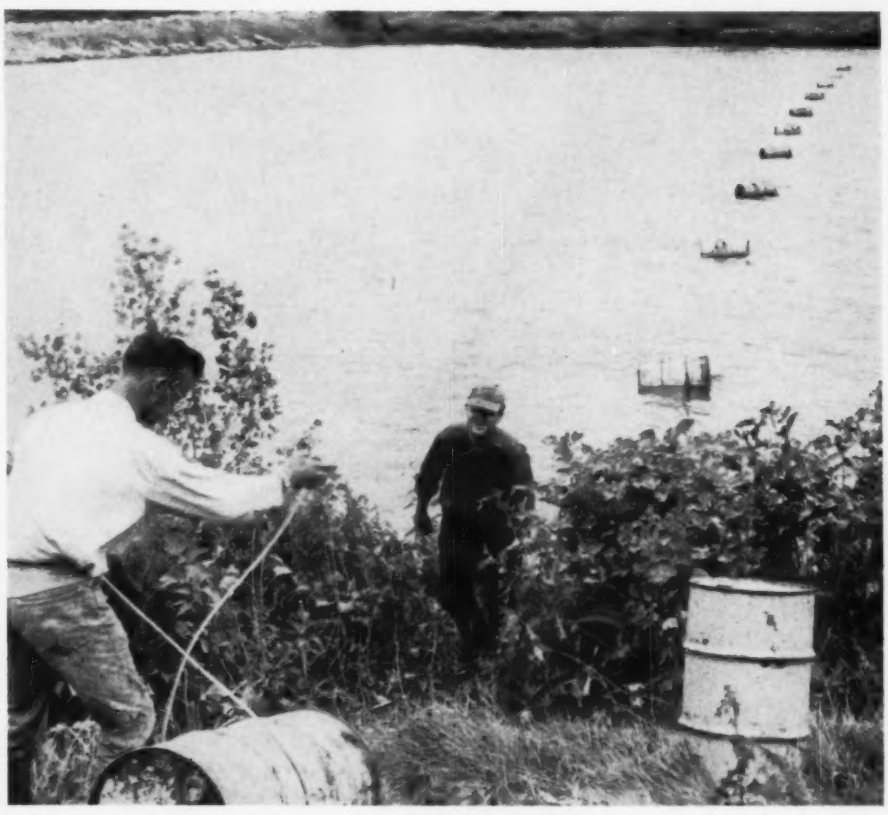
DECEMBER 6, 1958
VOL. 155—NO. 23

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



FLOATING CABLE

Northwestern Bell plant men preparing to tie 700-foot piece of tape-armoured cable to metal barrels to float it across lake near Huron, S. D.

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $4.00 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

Guaranteed Circulation This Issue
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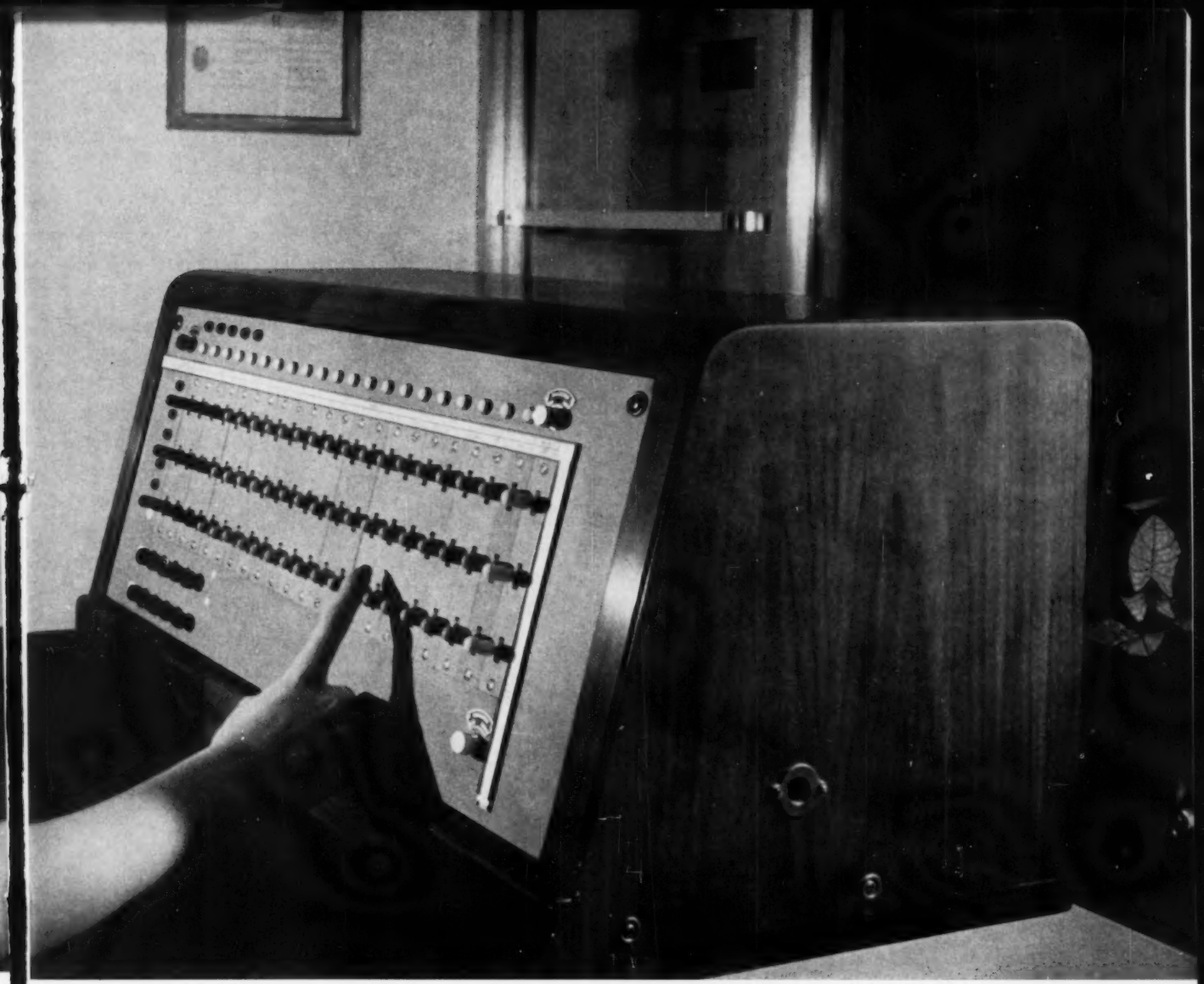
FALL RURAL ISSUE

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

Cash in on exclusive eye-appeal



With the No. 121 Cordless Switchboard by Stromberg-Carlson you give commercial subscribers the *only modern-style* cabinet of its kind in the industry—as well as complete PBX service.

Its beauty graces any office. The cabinet comes in warm two-tone walnut veneer with sun-tan key panel. It provides attended service for 12 or 16 inside lines, 5 trunks, 5 connecting circuits. Lets secretary or clerk double as an operator.

Our No. 120 cord-type switchboard is exclusive in *its* class, with all operating advantages plus the *smartest modern styling*. Models are available for single- or multiple-position installations. A wide variety of auxiliary services is provided for.

Reduce your operating costs by retiring your old switchboards for these new, modern, low-maintenance-cost PBX's. You'll boost not only your profit but *prestige* as well. For technical data and ordering information, contact your nearest Stromberg-Carlson representative.

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FLASHES AND PLUGS

WOMAN'S WORK. An Antrim, Ireland farmer, who complained that his wife did not shoulder her full share of the burden, agreed to run the household for one day.

He kept a minute record of his activities. It read:
Opened the door for children: 106 times.
Shouted "Stop Johnnie": 94.
Tied their shoes: 16.
Stopped quarrels: 19.
Answered telephone: 11.
Provided glasses of water and milk: 26.
Answered questions: 202.
Ran after children: About four and one-half miles.
Lost temper: 45 times.

The very next day he bought his wife the washing machine she wanted.—*Irish Digest*, Dublin.

•

PROGRESS! Wallace C. Olson, general manager of the Northern Illinois Telephone Co., Lanark, sent us a Pecatonica (Ill.) *News* clipping which appeared in the column: "Uncle Neb from Winnebago." The Northern Illinois company serves Pecatonica and Mr. Olson was particularly interested in this telephone contribution to progress:

"Our preacher said Sunday that things is gitting better all the time. He says folks is gitting more and more religion every day, and he based it on the fact that there ain't near as much cussing and profanity as they used to be. I ain't no feller to argue with my preacher, but he ain't even close to the reason we ain't got the expert cussers we used to have. The passing of the mule has got folks out of practice in the cussing business.

"The stubborness and cussedness of a mule would make a feller rip off cuss words that could be heard three and four farms down the road. A farmer, mad at the contrariness of his mule, would cuss until his face got purple and he fell in the hog trough in a fit. Naturally, his wife and children would hear all his cussing and they would turn out to be pritty good cussers theirselves.

"But today when a farmer gits to the point of destraction because his tractor won't run, he just picks up his telephone and calls a mechanic.

"If cussing was bad fer religion, I reckon the pore mule will have to take most of the blame. My preacher, I'm afeared, is confusing the scarcity of mules with the increase in religion."

•

FALSE MODESTY. A well-meaning lady held a cooky above her dog's head and commanded, "Speak! Speak!"

"Why," said the dog modestly, "I hardly know what to say!"

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

December 6, 1958

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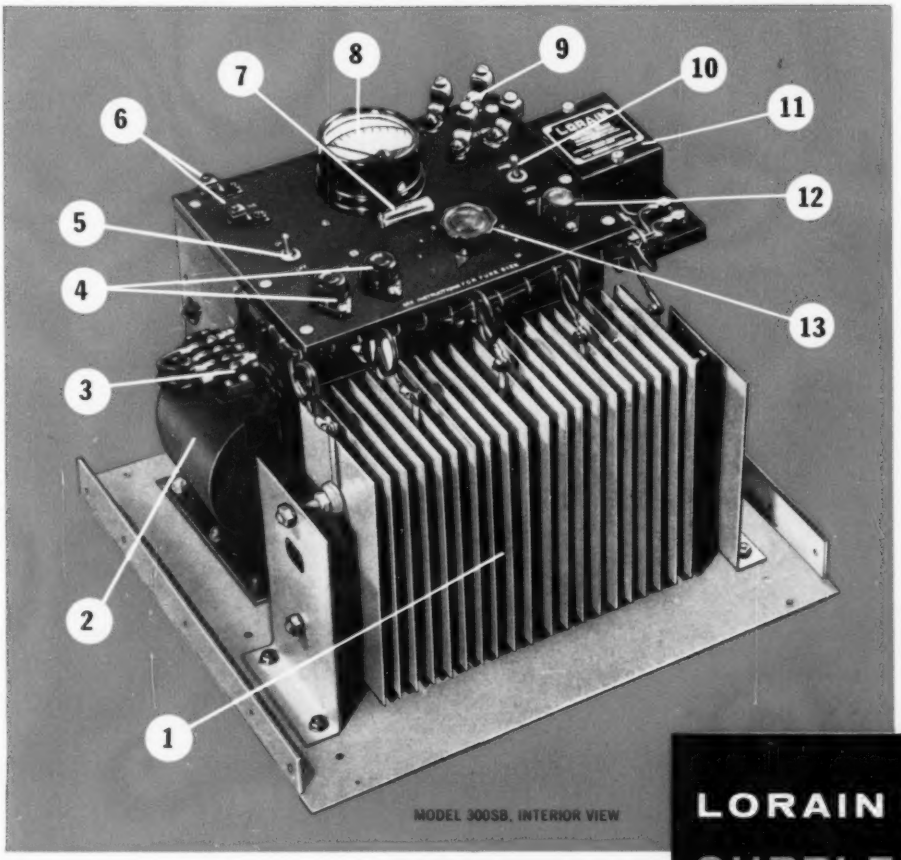


MODEL 300SB, INTERIOR VIEW

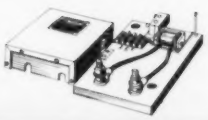
1. Selenium rectifier
2. Isolating transformer
3. Taps to adjust for A-C line voltage
4. A-C line fuses
5. On-off switch
6. A-C input terminals
7. Neon lamp to indicate tripping of overload relay
8. Output ammeter
9. D-C connections
10. Output range selector switch
11. Control relay, type FS1R
12. D-C load fuse
13. Tap switch

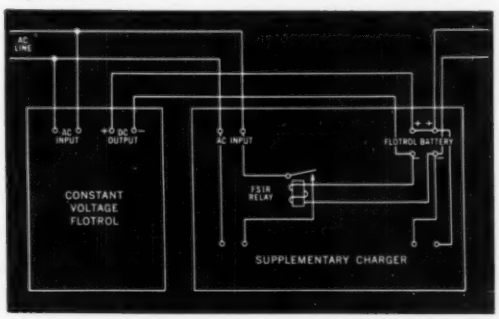
LORAIN FLOTROL SUPPLEMENTARY CHARGERS

For peak loads and growing plants . . . save money with "a Flotrol and a half"

Here is the low-cost answer to expanding loads that are taxing the capacity of your charger. A Lorain Supplementary Charger matched to your Flotrol as much as doubles its capacity at a fraction of the cost of a larger Flotrol. It is also used in new installations to get an "in-between-size" Flotrol and avoid paying for un-needed capacity. The Supplementary Unit delivers a constant current which is adjustable by a tap switch. Controlled by the master Flotrol, it provides a closely regulated output voltage. A control relay shuts the unit off when it is not needed. Proved in service since 1950. Thousands in use. Seven models, with output from 3 to 24 amps., 45-56 and 25 volts. Rack or wall mount. Write for Bulletin 171A.

FS1R Control Relay is mounted inside the unit and is wired as below. Externally mounted control relays (see right) are offered to simplify heavy wiring for the larger Flotrols.





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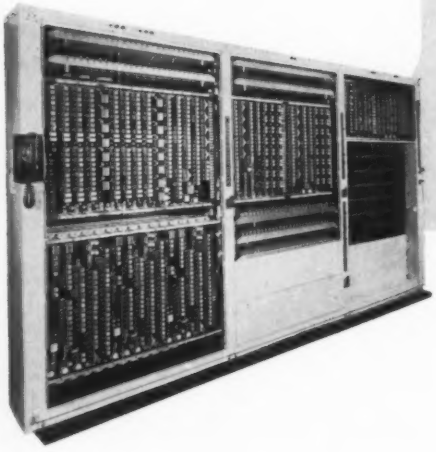
new K 60



The fabulous Kellogg K-60 Crossbar Switching System, with its many exclusive features, represents the most advanced crossbar unit in the telephone industry. It is the latest addition to the Kellogg switching line—the most complete array of dial switching systems ever offered independent telephony: the K-60, Relaymatic and Step-by-Step. And for fast dependable manual switchboards Kellogg is also your first choice. Each system is designed to offer maximum service facilities with minimum supervision and upkeep.

Whether your operation is large or small, Kellogg's knowledge, experience and equipment guarantees you the best choice in switching systems. Backed by more than 60 years of service to the independent telephone industry and by the vast, world-wide facilities of ITT, Kellogg sales representatives and engineers can help you decide the type of equipment best suited to your present requirements and future expansion needs.

For more information on any of the systems listed, call your Kellogg representative.

Kellogg Switchboard and Supply Company, Sales Offices: 6650 S. Cicero Ave., Chicago 38, Ill. Communications Division of International Telephone and Telegraph Corporation.

crossbar

Maximum Flexibility In Switching Systems

World's Most Complete Line of Switching Systems

K-60 CROSSBAR. Telephony's most advanced switching system • Can be engineered to fit any size requirement • Allows maximum expansion: one unit handles from 10 to 10,000 lines • Extremely low terminal addition cost within existing 1000 station group • Permits terminal-per-station service with terminal-per-line equipment • Four classes of service available for each line.

Self-checking: detects trouble and locks faulty path until correction is made • 100% intercept facilities as standard equipment • Meets requirements of nationwide toll dialing • PBX numbers may be spread over entire office: no need for special high traffic connectors and reservation of certain connector levels for PBX expansion • Minimum maintenance: all-relay action.

Simplified main distributing frame; no bunch blocks required • Toll access restriction by 10-line groups • No charge assignment on specific lines for paystation calls to police, fire department and telephone business office.

Drawer-mounted switches. Many other exclusive features such as conversation timing by 10-line groups, special revertive call features • 1500 ohms standard loop requirements.

RELAYMATIC. Dependable switching • Smooth and quiet in all complex switching operations • Simplified installation • Easy maintenance: one standard component—the relay • Simplified wiring • Operates with any type of trunk line • Standard circuitry • Incorporates all features of inter-toll dialing • Available in 3 equipment heights from 6 to 9 feet • Local lines provide up to 10-party full selective divided ringing • Adaptors available for grounded rural lines • Particularly adaptable to terminal-per-line offices.

KELLOGG STEP-BY-STEP. Community or Main Step Exchanges (CSX or MSX) • Long life, low cost operation • Ease of maintenance • Simplicity of equipment and circuits • Compact space-saving arrangement of equipment • Trunking flexibility • Ready low-cost expandability for increased station and traffic requirements • Maximum dependability and flexibility in arrangement.

MANUAL. All types available to individual specifications, including #3 toll with 2-position 6 panel • Key senders • Also common battery local and cord and cordless Private Branch Exchanges.

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AERIAL AND DUCT TYPE

DIRECT BURIAL TYPE

PHELPS DODGE TELEPHONE WIRE

THE "MINE-TO-MARKET" QUALITY

Exchange Area Telephone Cable

This Phelps Dodge cable, designed for aerial, duct and direct burial use, has a lightweight, thermoplastic construction—including fully color coded conductors—that makes handling easier and cuts installation time.

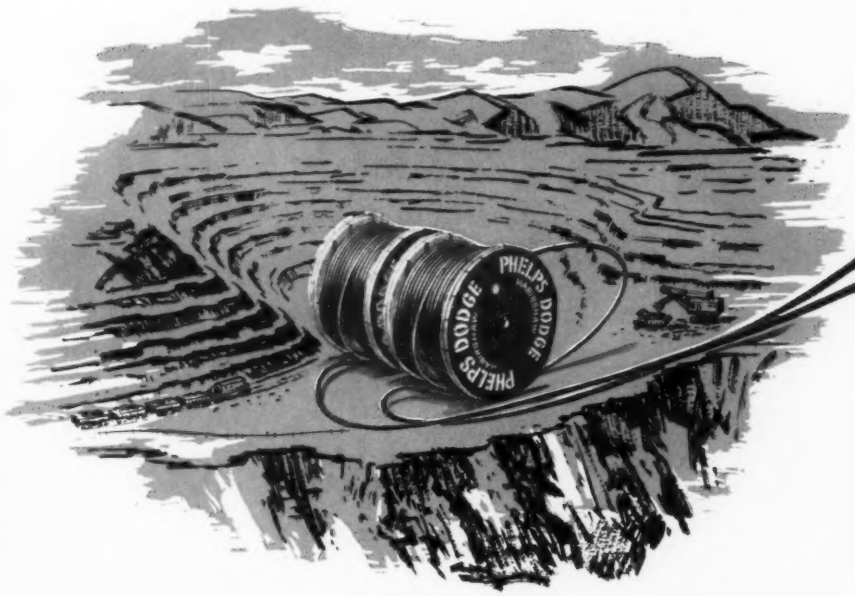
Exceptionally fine electrical properties and superior resistance to moisture, weathering and abrasion are assured through the use of highest grade materials, skilled workmanship and manufacturing experience.

The controlled craftsmanship and high quality of Exchange Area Telephone Cable are typical of the entire line of Phelps Dodge telephone wires and cables including:

- Self-Supporting Telephone Cable
- Rural and Urban Distribution Telephone Wire
- Interior Telephone Cable
- Rubber-Insulated Lead-Sheathed Telephone Cable
- Paper-Insulated Lead-Sheathed Telephone Cable
- PD-Tel Wire

AND CABLE

LINE!



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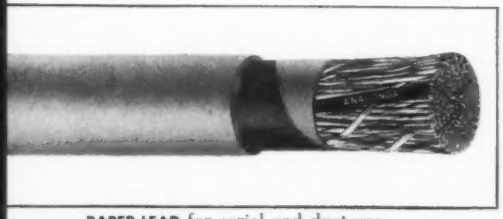
PD

See the Man from Anaconda for

Paper-lead Telephone

in the type and size you need . . .

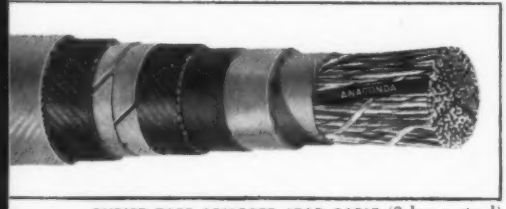
Choose Anaconda Paper-lead Telephone Cable in the type you need.



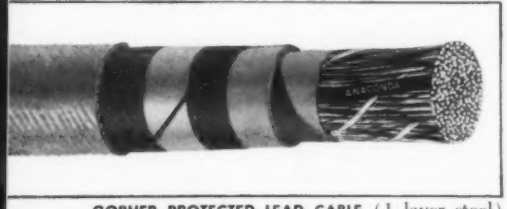
PAPER-LEAD for aerial and duct use.

POLYETHYLENE PROTECTED LEAD CABLE offers high resistance to corrosion and electrolysis.

JUTE PROTECTED LEAD CABLE resists corrosion and electrolysis.



BURIED TAPE ARMORED LEAD CABLE (2 layer steel) for areas subjected to low-frequency induction from nearby power lines.



GOPHER PROTECTED LEAD CABLE (1 layer steel) direct burial cable where mechanical protection is needed.

ANACONDA PAPER-LEAD TELEPHONE CABLE being installed near Harold, Kentucky.

Cable from 6 to 2121 pairs—

. . . when and where you need it!

Anaconda offers you everything you need in paper-lead telephone cable—produced in a new, modern plant devoted exclusively to telephone cable products. Telephone experienced personnel who understand your problems utilize the latest, most exacting quality control standards—to produce quality telephone cable. And order service is prompt and efficient wherever you are because of a national network of distributors, Anaconda sales offices, and mills.

Call your Anaconda distributor or the Man from Anaconda for your paper-lead telephone cable needs. Also—write for new Catalog DM-5771. Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

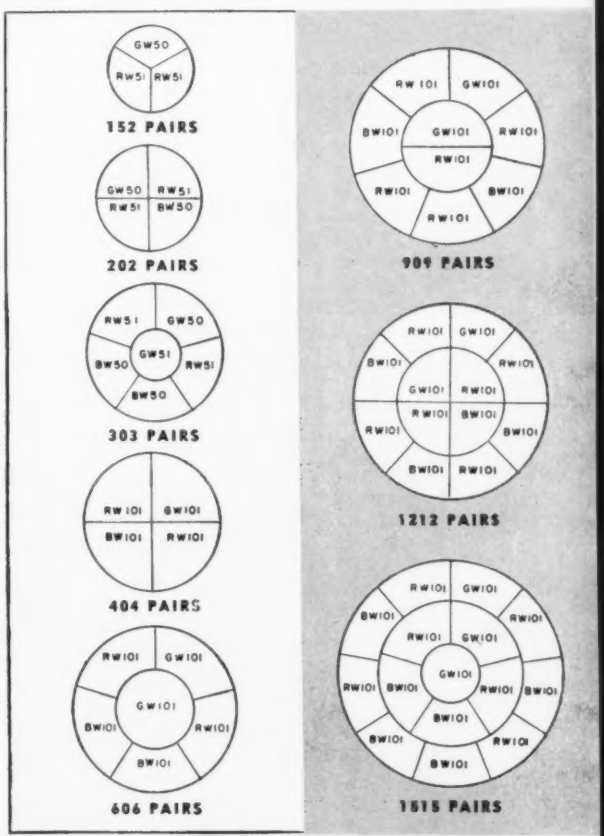
DM324

Shown here is a typical unit construction for 152 pairs through 1515 pairs, No. 24 Awg. Following constructions also available:

No. 19 Awg	6 through	455	pairs
No. 22 Awg	11 "	909	"
No. 24 Awg	11 "	1515	"
No. 26 Awg	11 "	2121	"

The number in the assemblies denotes the number of pairs in the unit. The letters refer to the color of the outside pairs of the unit. GW, green-white; RW, red-white; BW, blue-white. The units are further distinguished by a color-coded binder string.

Choose Anaconda Paper-lead Telephone Cable in the size you need.



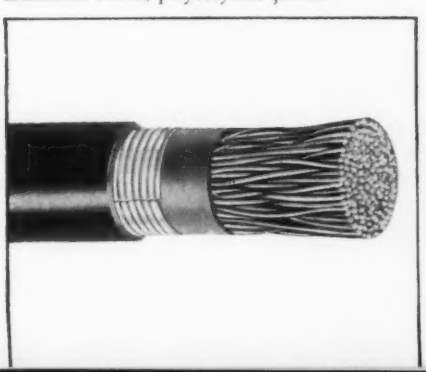
UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

PHONE THE MAN FROM ANACONDA®

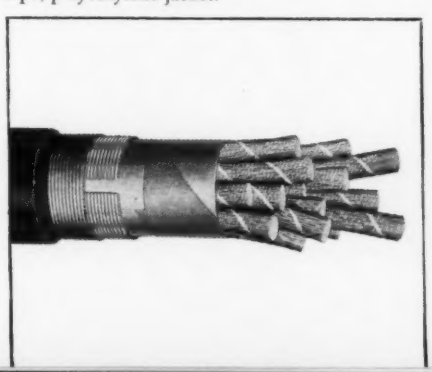
The Independent Manufacturer to the Independent Telephone Industry

FOR TELEPHONE CABLE

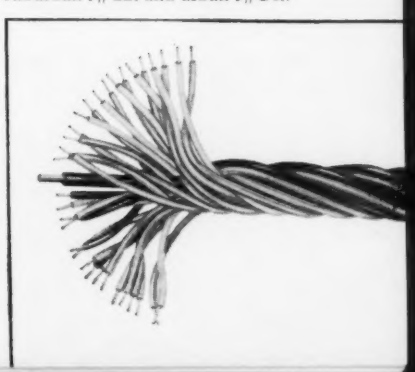
ALPETH—Polyethylene-insulated, low-resistance aluminum shield, polyethylene jacket.

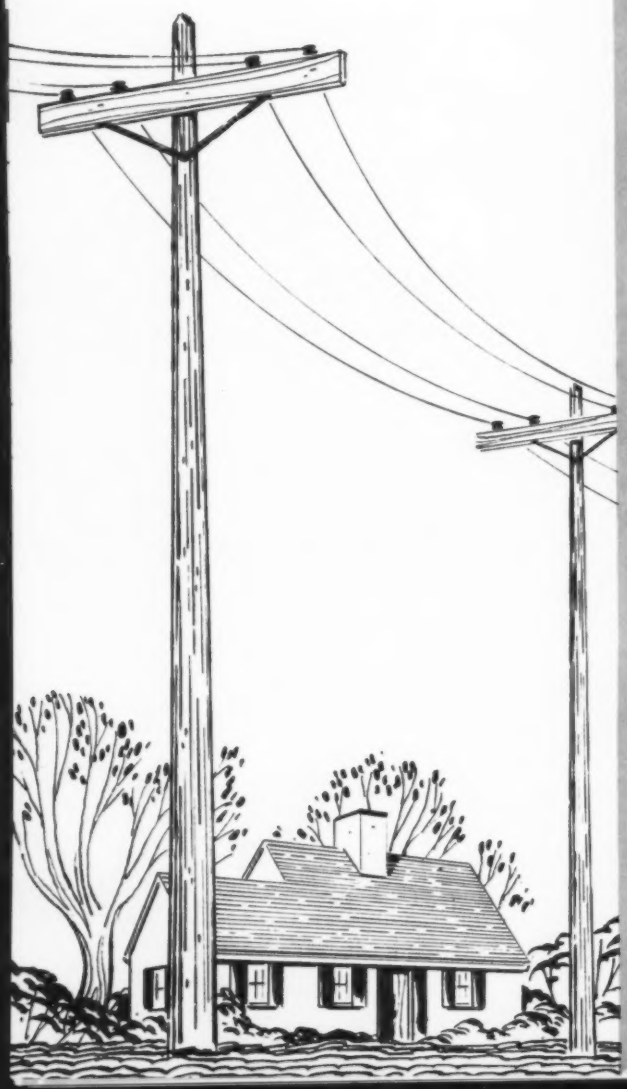


STALPETH—Paper-insulated, aluminum shield, steel tape, polyethylene jacket.



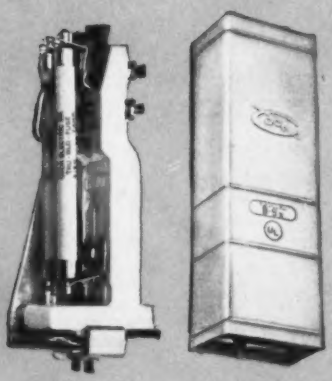
DISTRIBUTION WIRE—rural [#19], suburban [#22] and urban [#24].





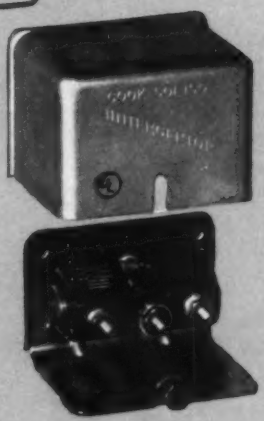
Reliable Strand Cable Terminal

Reliable Outdoor Protector

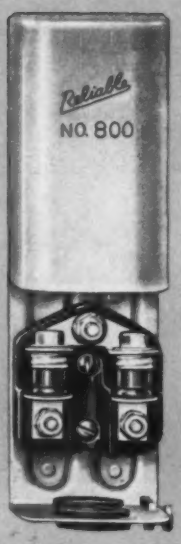


Cook Substation Protector

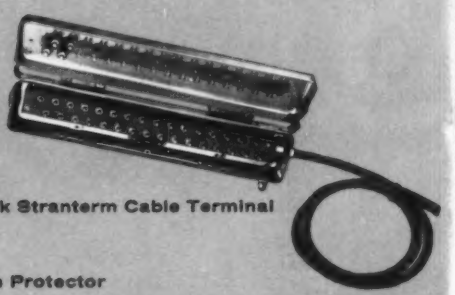
Reliable Ready-Access Terminal



Cook "Interceptor" Fuseless Protector



Reliable Fuseless Station Protector



Cook Stranterm Cable Terminal

AUTOMATIC ELECTRIC SUPPLIES TERMINALS AND PROTECTORS FOR ANY TELEPHONE OPERATION!

Automatic's supply service provides a complete line of terminals, protectors and associated equipment. You get famous brands you can count on for high quality and long-run economy. And you never have to worry about delivery. One of our five friendly warehouses is nearby—to give you quick, efficient service. Call your Automatic representative or your nearest A. E. Sales Corporation warehouse.

Automatic's 5 friendly warehouses:

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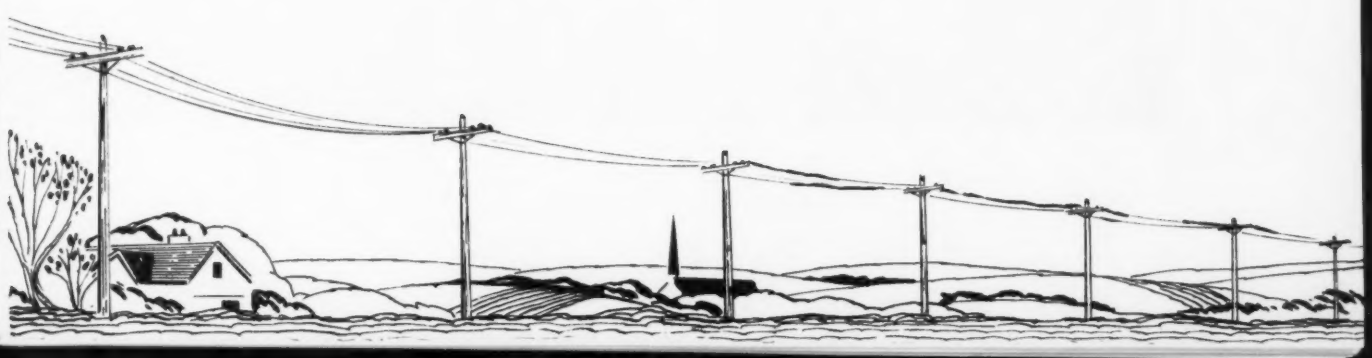
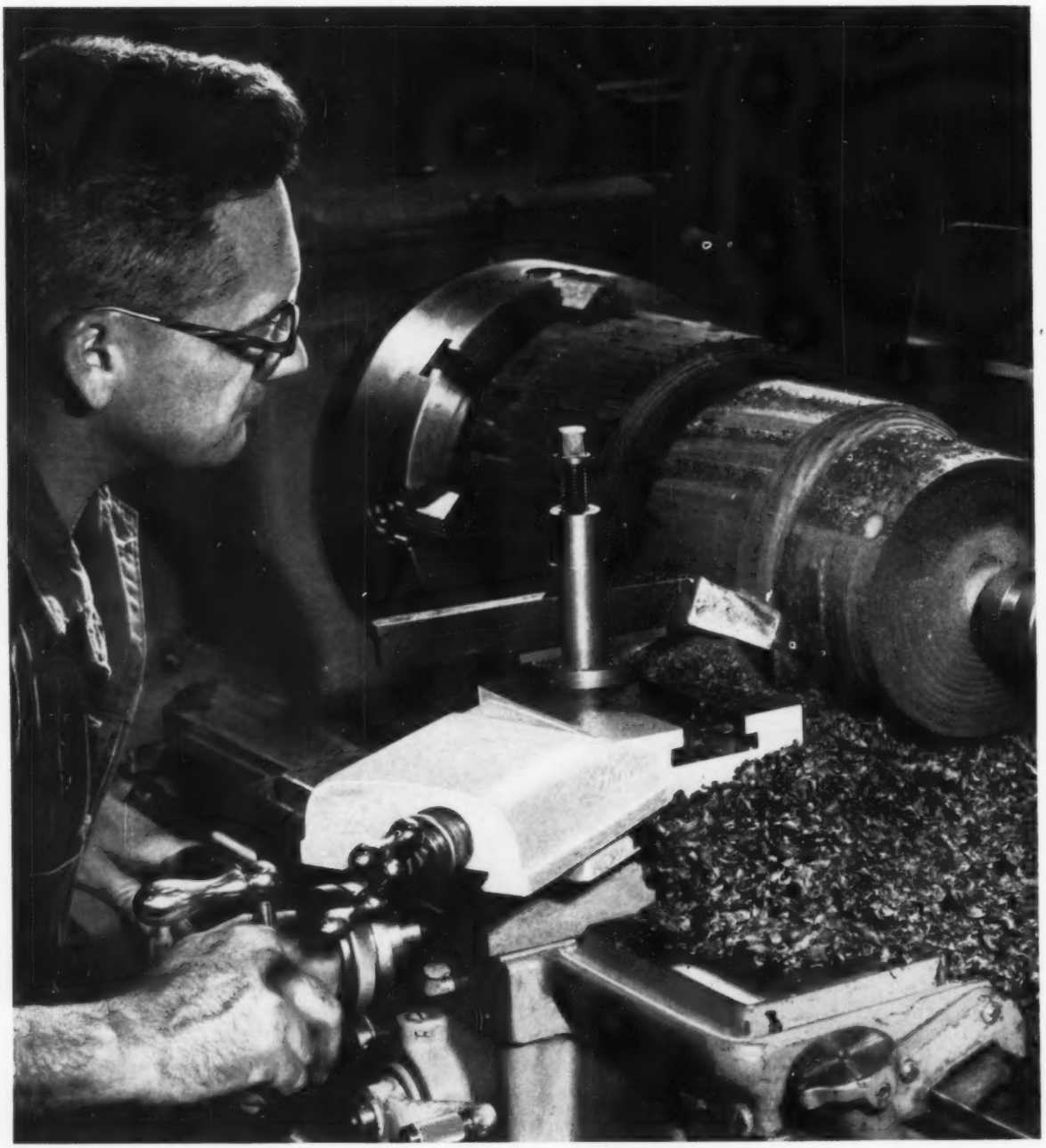
AUTOMATIC ELECTRIC

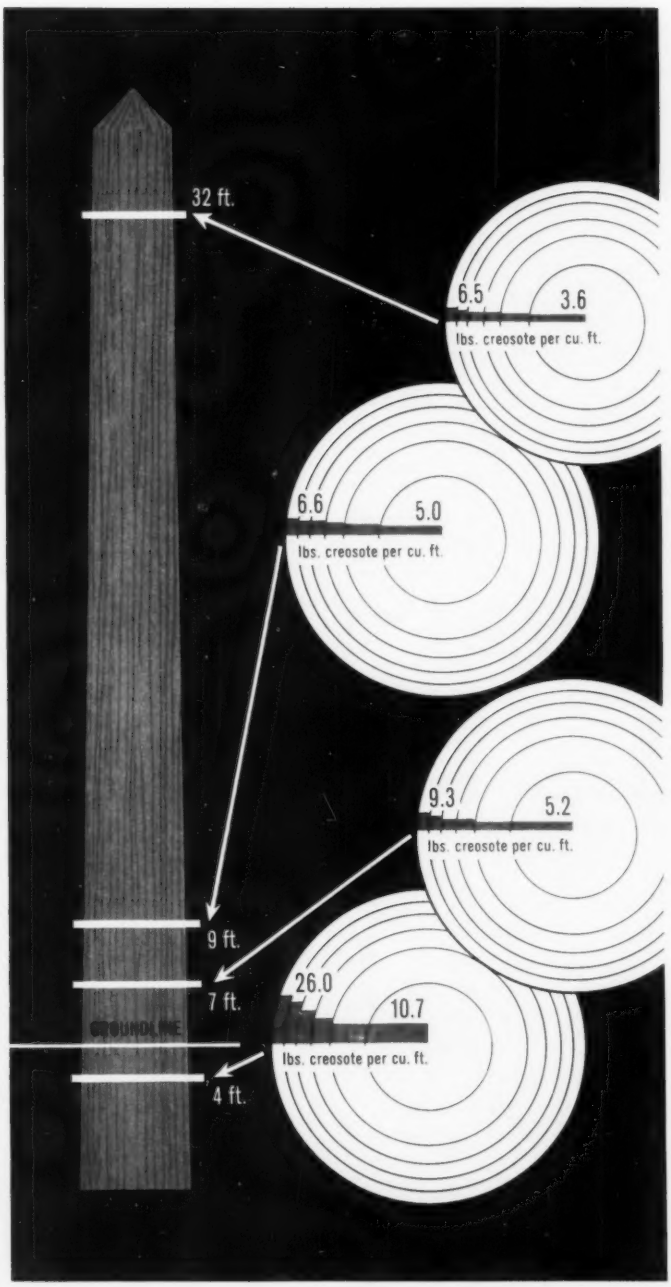
Subsidiary of **GENERAL TELEPHONE**



We pull poles



to stretch service life



Scientists at United States Steel's Applied Research Laboratory conduct continuing studies to determine how and why pressure creosoting gives longer life to wood. In one experiment, a power-line pole that had been in use for 23 years was pulled from service and taken to the laboratory for study. Sections from various parts of the pole were cut out and reduced to minute shavings. Care was taken to keep the shavings from each layer of each section separate. Then, by using solvents and special extraction methods, the creosote from each batch of shavings was recovered. Analysis of the shavings from each section revealed how the creosote had behaved during service.

Results:

1. The original treatment averaged 8.6 pounds of creosote per cubic foot of wood. After 23 years, the average over-all retention was 6.6 pounds per cubic foot—more than enough creosote to ward off the heaviest attacks of termites or rot-producing fungi.
2. The creosote was gradually *redistributed* throughout the pole (see diagram). The creosote had actually formed an "armor belt" extending from about three feet below the ground line to 2½ feet above the ground line. In this important section, creosote concentrations were 3 to 20 pounds *more* than the average—and they were heaviest near the outside of the pole where protection was most needed.
3. The test indicated that a pressure-creosoted pole like this one might last for 50 to 60 years under similar conditions.

For more information on the advantages and economies of pressure treatment with USS Creosote, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., or call your nearest USS Chemical Sales Office in Pittsburgh, New York, Chicago, Salt Lake City or Fairfield, Alabama.

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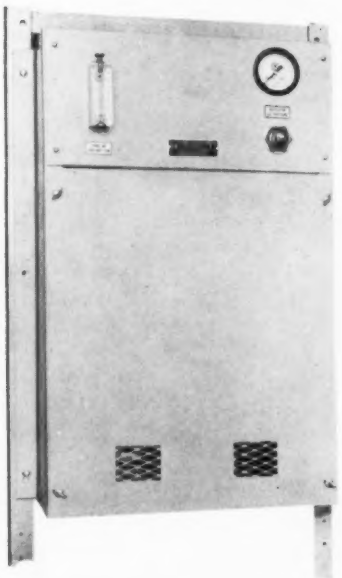
THE MODEL "R" DEHYDRATOR (AUTOMATIC)

for pressurizing aerial and underground telephone cables



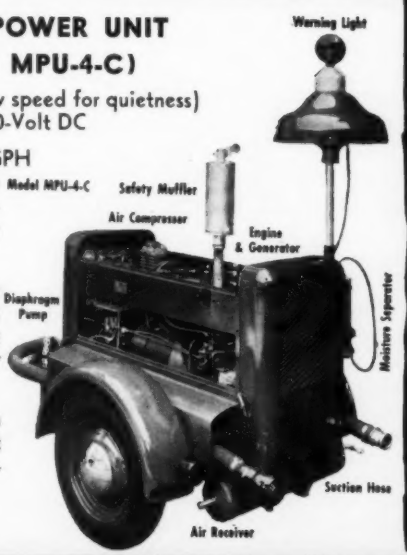
The Model "R" Dehydrator is designed to supply dry air to telephone cables. Among its many outstanding safety features are:

- Hi-Lo pressure switch for alarm
- Humistat for alarm above 4% R.H.
- Power failure relays and separate fustat
- By-Pass Valve & Alarm for excessive R.H.
- Mechanical control valve for stand-by air supply (O.P.N.) in event of power failure
- Additional safety features on air compressor
- Power supply is 115-volt, AC on the Dehydrator and Air Compressor
- Power consumption—2 AMPS

The Model "R" Dehydrator (Automatic) is designed for small installations of 80 miles or less of cable. It is a wall or relay rack-mounted type, approximately 24" high, 28" wide and 8" deep. Operating voltage is 115 volts, 1 phase, 60 cycle, and the output is 700 standard cubic feet per day maximum, with a dewpoint of —40°F. and power consumption of 2 AMPS.

MOBILE POWER UNIT (Model MPU-4-C)

- Generator (slow speed for quietness) 2500 Watt, 110-Volt DC
- Pump—2800 GPH Diaphragm to remove seepage and drain back
- Air Compressor —to put cables under pressure for cutovers or repairs
- Furnished with or without pump and compressor.



MODEL "A" Air Compressor Dehydrator

Exchange unit equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 60 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.

- Completely automatic in operation
- Air purifier to eliminate oil mist
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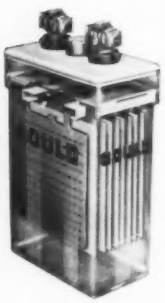

The ability to "take it" day in and day out . . . *and still deliver peak power* is an important characteristic of Gould Batteries.

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More Power to you from Gould

The stake of the small company in an expanding U. S.

Its future opportunity will be limited to the ability and energy of management to realize its full potential

By FRANCIS X. WELCH, Washington Editor

WITH AMERICAN business now generally regarded as well on the way to recovery and further expansion, the future direction of the telephone business is an interesting subject to explore. Of course, there are professional market analysts, specialized in studying telephone industry trends for many years, who can tell us some pretty definite things on this subject. But, for a smaller telephone company caught in the cross-currents of conflicting fears and hopes about its own future, some guides and landmarks should be most welcome at this time.

The confusion is understandable. We hear and read on every side about marvelous new discoveries and long strides being taken by the major telephone companies, both Bell and Independent, in the fields of radio and electronic development. We see evidences of new forms of communications of business opening up beyond the long-established boundaries of conventional telephone service, such as microwave point-to-point and mobile telephone services. We hear of new avenues of business being opened *within* the existing fields of long-established telephone service, such as extensions and multi-subscriptions and the merchandising of appliances on a scale never practiced before.

How does the small telephone company fit into this swiftly changing and rapidly expanding panorama of over-all opportunities for the industry? Obviously, it cannot command the services of research laboratories which would put it into the race for the discovery of new technologies of communications. It cannot risk its limited resources in trying to match the commercial adventures of radio and other non-utility operators in untested marginal fields of service. And, even within its well-defined area of exchange service, there is a limit to what the small telephone company can do in allocating its budget to sales and promotional activities at the expense of regular operating requirements.

Has Important Place

Yet, in all of these areas the small telephone company still has an increasingly important place. That may seem surprising to some readers. And, it is not an insecure place, or one which need be taken over and gobbled up tomorrow by some better heeled neighboring operator. But, the smaller company can fill the place only so long as it is able to stake out its own preserves and work the field which industrial fortune has given to it.

A fact commonly overlooked, in such general discussions, is that the new business opportunities are not confined to big cities or long distance traffic. They are drifting into new areas, rural areas, or small local areas. The farmer who was satisfied two decades ago with a hand-crank telephone, and a few years ago with an indifferent party service, is now ready for a variety of services, if his telephone company can bring them to him. An upsurge all along the line of communications — largely featuring telephone service—is becoming the new dimension of an unfolding future pattern of the American way of life.

A long time ago a certain engineering authority once estimated that man, using his own muscles, only developed one-tenth of a horsepower. That is all he could depend on, if he had to work his own field without other forms of power — as primitive man did before the ox and the horse were domesticated. Since then, the successive evolution of steam power and electric power have increased man's productivity tremendously. Since 1950, modern technology has increased the power for each farm producer by 50 per cent. By 1957, each man on an industrial job used *nine* kilowatt-hours for each hour he worked. That is the equivalent of 12,000 horsepower! This was certainly a big increase over the one-tenth horsepower which was the standard equipment of Adam and Eve.

But, what of the future? There is reason to believe that, in some respects, communications, rather than electric power, will be responsible for much of the increase in productivity which will surely come. Translated into terms of telephone service this means that every new telephone appliance or supplemental telephone service will *save* kilowatt-hours of electricity, instead of using them. It means a saving in terms of automobile transportation, or time and effort which would otherwise be consumed in establishing satisfactory

communications under less efficient methods.

Public Will Be Served

The efficient small-town resident and businessman of the future, as well as the up-to-date farmer, is going to have these supplemental services—interconnections and intercommunication services—in his place of business, in his home, or throughout his acreage. In the future, he will also need radio-telephone or paging services to keep in touch with his traveling business interests.

These things are not going to be the exclusive programs of large telephone companies—unless, of course, there is a default—through the unwillingness or inability of smaller companies to carry their share of the business in their local service areas. They already have a legal guarantee of their right to serve. Under present law, in most of the states of the Union, the telephone company already has its service area marked out and protected. It can lose this only by throwing it away, through failure to rise to the occasion which is surely ahead for the entire telephone industry.

To realize the opportunity of the future will, of course, require a good deal of initiative, intelligence, and hard work on the part of existing small company management. They cannot start sooner to put their houses in order for the great days to come than right now. And, if they do not put their houses in order, the great days will not come for them. They will have to give way to others who can fill the need.

The obvious small company problem, of course, is one of plant modernization and plant expansion. But, equally important are the allied responsibilities for getting rates at a proper level to deal suitably with revenue requirements. No company can give a jet-age type of service with a horse-and-buggy rate structure. Tied into this picture is the importance of keeping proper records as an inducement for adequate financing.

And, there are negative factors to consider—the obstacles and the stumbling blocks. There are two things which could stand in the way of many small companies not growing fast enough to take care of such future responsibilities. First, there is the important factor of public relations. Many small companies, which have let inadequate plant or poor service form the basis for public misunderstanding of its problems, have a real job on their hands in regaining local confidence that they *can* do the job. Fortunate is the small company whose public relations have not yet drifted into that unhappy state. But, in either event, remedial measures can be taken to assure present and future subscribers that *their* company is not only ready, willing, and able to do what is needed; but that it is *best* able to do so, under all surrounding circumstances.

Advantages of a Small Company

That may seem like a tall order. But, it is a claim which can be truthfully made and sustained by many small companies, if they have a management with sufficient resourcefulness to demonstrate the validity of such a claim. There are good reasons why existing small companies are in a position to do as good a job, if not a better one, than large interests. What are such reasons? Here are three:

(1) *Existing Neighborly Relations.* The small company intimately knows the community and the people in the community. It knows the potential of the community. It does not have to spend vast sums and time accumulating such knowledge. An outside company would.

(2) *Local Business Ties.* A small local company naturally tends to deal with local people. From the contracting of construction to the hiring of employes, the "home town" telephone company has an inside track. Out-of-town telephone interests must conform to an established pattern of construc-

(Please turn to page 90)

REA Approves Three Loans

The Rural Electrification Administration has approved the following telephone loans:

Southeast Iowa Telephone Co., New London; $143,000; Nov. 17.

The borrower proposes to use these funds to extend its operating territory in order to furnish new and improved service for 297 rural subscribers. Fifty of these rural families will receive initial service. The remaining 247 now receive magneto service from the Lockridge Telephone Co. and the Salina Telephone Co. The Southeast company plans to acquire access rights to the territories served by these two switcher companies.

A new automatic central office is scheduled for construction at Lockridge to serve both communities. The two REA loans to this borrower, totaling $439,000, will enable it to furnish new and improved service to 1,180 rural subscribers. The completed system will consist of exchanges at Brighton, Farson, and Lockridge. Two exchanges are now furnishing dial service to approximately 750 rural subscribers.

Arthur W. Sanders is president and manager of the Southeast Iowa Telephone Co.

•

Fairmount (Ga.) Telephone Co., Inc.; $262,000; Nov. 20.

This loan will enable the new borrower to improve and expand rural telephone service. The borrower's 275 subscribers will receive improved service and 267 rural families in the area will receive initial service. The Fairmount company provides dial service.

A new combined headquarters and automatic central office building is scheduled at Fairmount, and an automatic central office building will be constructed at Range to serve the expanded system.

Edward D. Lacey is president and manager of the Fairmount Telephone Co.

•

Dobson Telephone Co., Inc., Stillwater, Okla.; $215,000; Nov. 20.

The new telephone borrower proposes to use these funds to improve service for 187 present subscribers and to furnish initial service for 175 rural families. The existing subscribers now receive dial service through the borrower's Arcadia exchange, and magneto service through its Meridian exchange.

The borrower's construction schedule includes new automatic central offices in both locations. The present automatic equipment in Arcadia will be installed in the new Meridian building, and new and expanded automatic facilities will be placed in the Arcadia building.

E. R. Dobson is president of the Dobson company and R. L. Dobson is manager.

Further Consideration of Buried Facilities in Urban Areas

By C. H. ELDER*

THIS ARTICLE intends to supplement the paper on this subject published in the May 24, 1958 issue of TELEPHONY and to give many of the detailed engineering, construction, maintenance and cost considerations applicable to buried telephone facilities in *urban* areas. We think that we have enough experience with this kind of construction to reach some conclusions regarding its feasibility.

The advantages claimed for buried plant by its proponents are well known, as are the disadvantages cited by the opponents. By proper consideration of the engineering and construction phases, we believe the advantages can be strengthened and the disadvantages minimized.

Urban underground distribution plant placed in a conduit system offers the greatest protection and flexibility for future relief, obviously. But, it is too expensive to be practical, in our opinion, and consequently we will deal here with plant buried directly in the ground only. The decision to bury must be based on the total cost factors including service wires, and all maintenance expense balanced against public demand and willingness to pay for excess costs over aerial construction, if any, in the form of higher rates or direct payment of excess construction charges.

Buried plant usually is considered feasible only in new subdivisions, although it may be practical where *complete* rebuilding of existing distribution plant is necessary. We find that new subdivisions are either laid out grid fashion or with curvilinear streets. The problems of anchoring and bracing poles in the latter type of subdivisions makes them appear most attractive for

*Mr. Elder is Outside Plant Engineer of Illinois Bell Telephone Co.

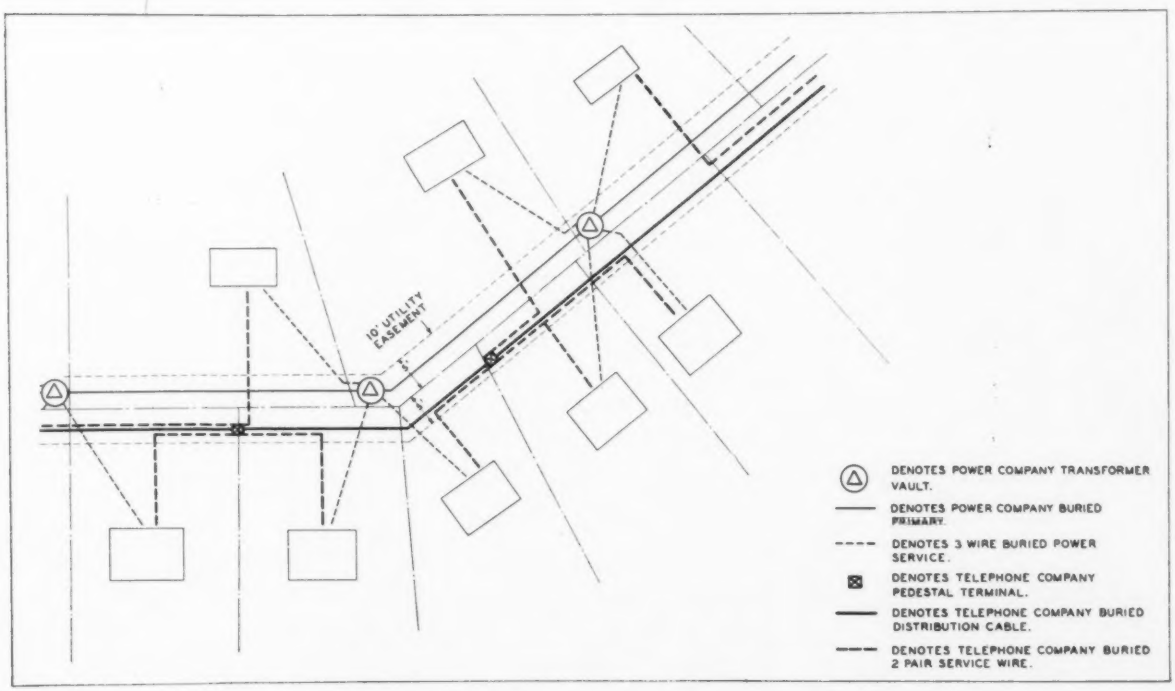

10' UTILITY EASEMENT
DENOTES POWER COMPANY TRANSFORMER VAULT.
DENOTES POWER COMPANY BURIED PRIMARY.
DENOTES 3 WIRE BURIED POWER SERVICE.
DENOTES TELEPHONE COMPANY PEDESTAL TERMINAL.
DENOTES TELEPHONE COMPANY BURIED DISTRIBUTION CABLE.
DENOTES TELEPHONE COMPANY BURIED 2 PAIR SERVICE WIRE.

Fig. 1. Typical buried installation—rear lot line easement method.

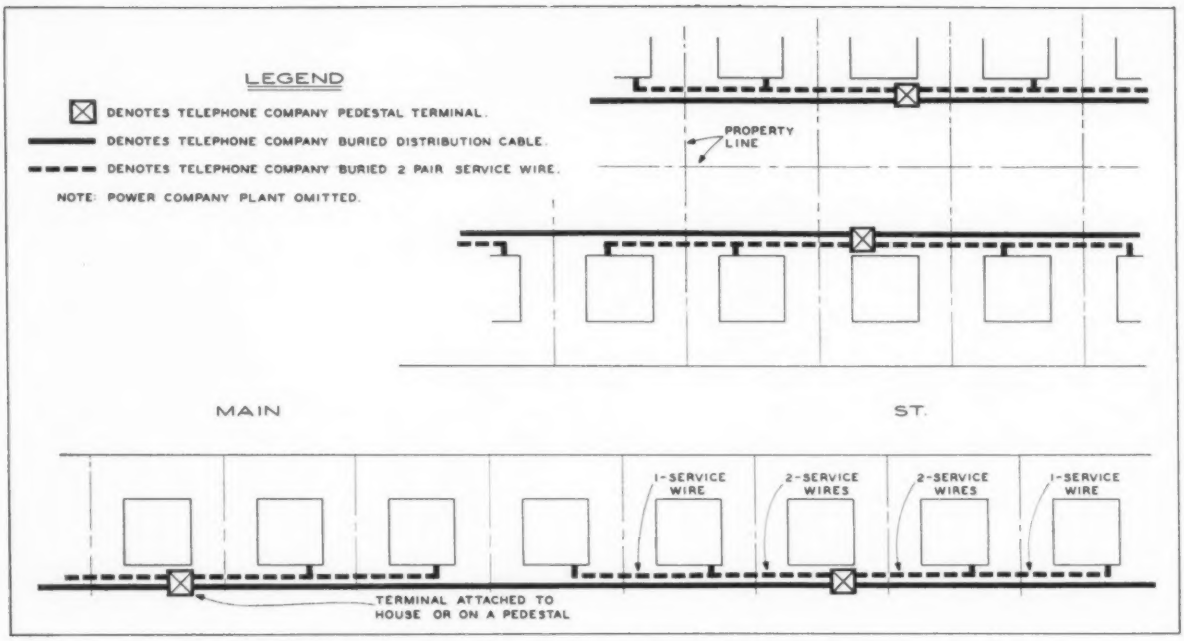


Fig. 2. Typical buried installation—rear house distribution method.

buried facilities from almost every standpoint.

Subdivisions can be placed in one of four general types:

(1) Houses are mass produced, entire block is built up by the subdivider and sold or leased after the home is completed. Buried plant can usually be placed at minimum cost in this type of subdivision.

(2) Streets, sidewalks and utilities placed and houses built by the subdivider according to buyers' specifications. Usually built up in a comparatively short time.

(3) Streets, sidewalks and utilities placed, but lots sold to individuals who build when ready. Usually takes long time for complete development.

(4) Combination of the above, but placed along main highways. Usually have irregular rear lot lines, unequal lot widths, etc.

Of course, there are soil and terrain considerations which affect the feasibility of buried systems. Rocky soil creates the biggest problem. Fine sand is almost as bad for trenching but plowing is fairly easy. Deep ravines and hills also create problems from the construction standpoint because of the difficulty of controlling trenchers. The custom of builders to pile the top soil at the rear of the lots is another problem. Determining the finished grade of rear property lines, and even of streets, is often difficult and requires cooperation of the builders.

In fact, the success of any buried system requires complete cooperation of the subdivider and builder from the very beginning, when the easements must be laid out, up to the time all homes are built and occupied. It is advisable to decide very early in the negotiations with the subdivider where the easements should be located—rear lot line, side lot line, front lot line, or at the back of the houses. Cooperation and coordination with the other utility companies installing underground plant is also important. It should be determined what other utilities, if any, will occupy the easements and it is essential to know whether or not the power facilities will be buried.

In selecting the pattern of distribution, the engineer should try to picture what the subdivision will be like 25 to 50 years hence. It is well to take stock of what has happened to similar areas during the past 50 years. Neigh-

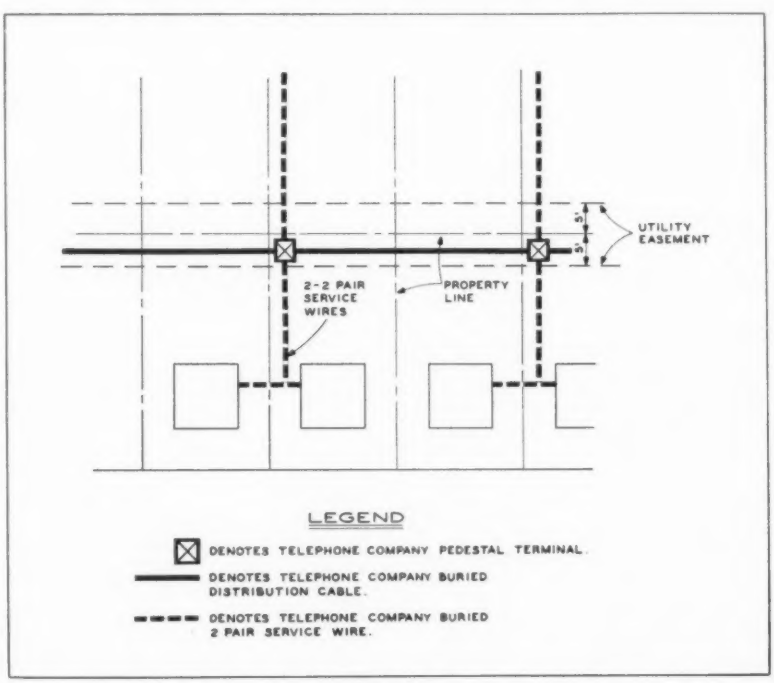
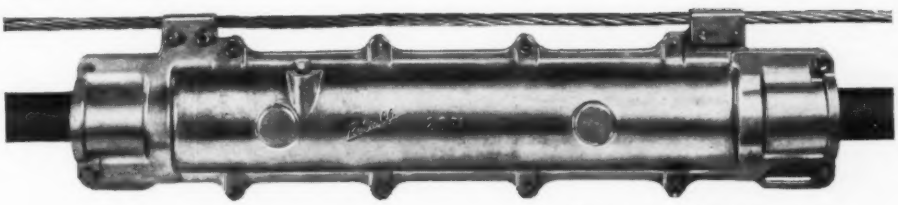

UTILITY EASEMENT
2-2 PAIR SERVICE WIRES
PROPERTY LINE
LEGEND
DENOTES TELEPHONE COMPANY PEDESTAL TERMINAL.
DENOTES TELEPHONE COMPANY BURIED DISTRIBUTION CABLE.
DENOTES TELEPHONE COMPANY BURIED 2 PAIR SERVICE WIRE.

Fig. 3

Now from Reliable...

splice cases



For use with lead, Alpeth and Stalpeth sheathed cables up to 1.6" diameter.

and

splice case terminals

Single terminal — 6, 11 and 16 pair.
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Send us your Installation Specification No. 104 and additional information on these splice cases and splice case terminals.

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Street _____

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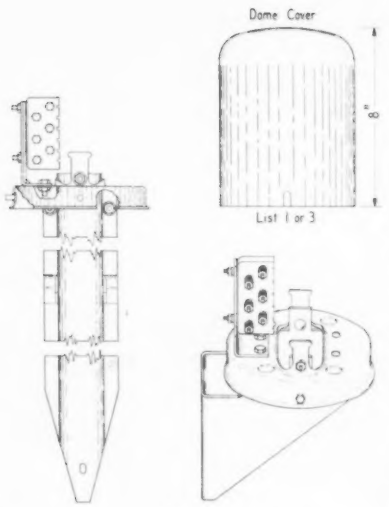


Fig. 4

borhoods seem to change character in about 50 years. Some of the best residential areas of half a century ago are now mixed-up communities of business, residential, rooming-houses, apartments, etc. Consequently, whatever is built today will have to be replaced, reinforced or removed in the future.

Engineering Considerations

The best buried distribution system, but not always the most inexpensive, is one that is the least likely to be interfered with, and which will cause the minimum notice and inconvenience to property owners. This we have learned from some 30 years of outside plant engineering experience. Therefore, where the terrain is reasonably level and not too heavily wooded, the rear lot line buried distribution system will prove most satisfactory in the long-run. It is a single cable-pedestal system per block as shown in *Fig. 1*, thus requiring the minimum of cable and terminals. It is the least likely to be interfered with, since it is in the back out of the way of building alterations or additions, and is the least objectionable to the property owner. The service wires are likely to be longer, however, than in other systems and, consequently, will cost more.

There are many places where placing the cable and terminals on the street side will be better, because of established grades, deep lots, and accessibility to the terminals, and because the service wires are usually shorter than in the case of rear service. The plant, however, is more susceptible to damage because of sewer, water and gas connections to the houses. Sidewalks and driveways may be a problem. Of course, usually, it requires a double cable-pedestal system for each block.

There is another system, illustrated in *Fig. 2*, which may prove very low in first cost, however, it is only adaptable to mass produced types of subdivisions. But, it is particularly good in flowing sandy soils where plowing instead of trenching is necessary. There are several undesirable features to this plan, such as, double cable-pedestal system, high susceptibility to damage by any large house enlargements or construction of patios, damage by fire, complaints from the owners of property on which terminals are placed. It seems to us to be the least desirable, over the long-pull, of any method, except in those particular situations where it is the only possible method.

One method often suggested for reducing the amount of trenching is to use side-lot easements for service wires between every other house (See *Fig. 3*). It has the disadvantage of not being very adaptable to other than the mass produced subdivisions. Also, most of the homeowners plant flower beds and build fences along the side lot lines and it has the age-old problem of digging up one person's yard to fix another's telephone service, if trouble occurs in the buried wire, which is seldom a good long-term arrangement.

How many pedestals, and where to locate them, is pretty much a matter of economics and depends upon the kind of distribution system employed. The advantage of availability of pairs, test points, and confining each customer's service wires to his premises only, seems to recommend a terminal at every other lot line for either rear or front distribution schemes. This affords a place to get at a pair quickly for either failure of the service, or to give service during periods of bad weather and frozen ground conditions. A serv-

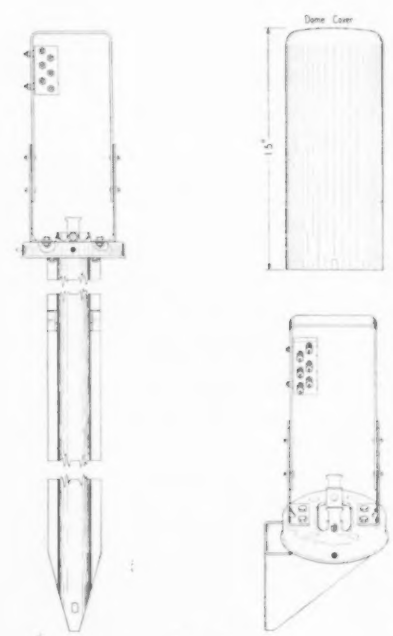


Fig. 5

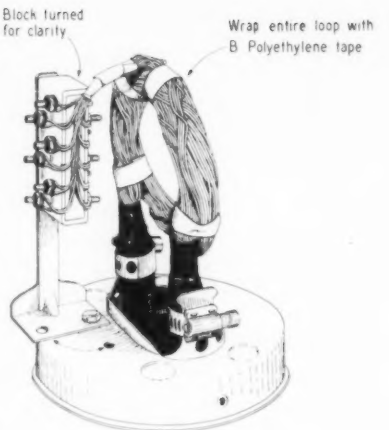


Fig. 6

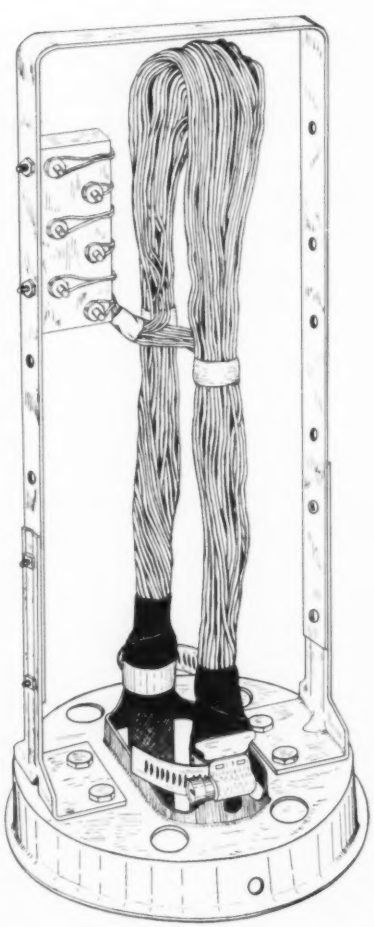
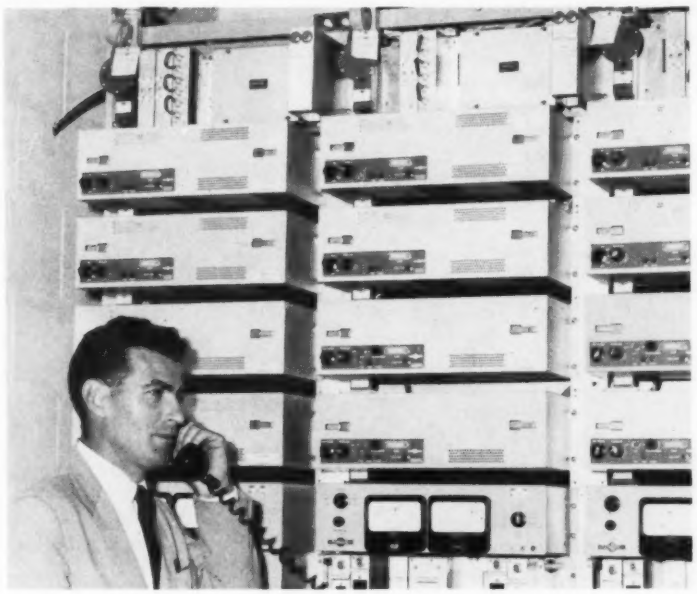


Fig. 7

Charles E. Connors, Lincoln Tel & Tel Transmission and Protection Engineer, uses service channel at Brainard station. The service channel gives order wire service between stations of the microwave system on a party line basis.



COLLINS MICROWAVE

doubles Lincoln Tel & Tel toll circuits

In expanding their toll circuits, Lincoln Tel & Tel had a requirement for a reliable communication system for all-weather service. A Collins Microwave System provided the economical answer.

Contributing to Lincoln Tel & Tel's selection of Collins Microwave were such service and maintenance features as complete assembly and pretest of stations in the factory; exceptional frequency stability; built-in metering and test facilities and fixed tuned IF amplifier requiring no field alignment when tubes are changed.

For complete information about Collins Microwave, write or call Texas Division Sales, COLLINS RADIO COMPANY, 1930 Hi-Line Drive, Dallas 7, Texas.

COLLINS

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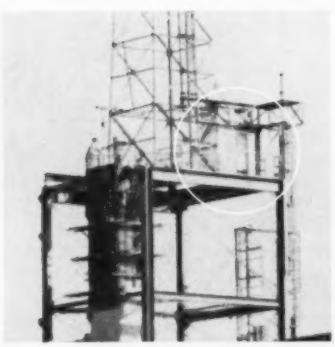
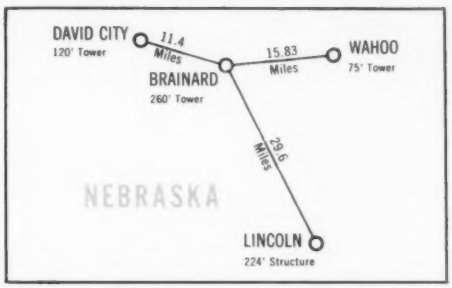


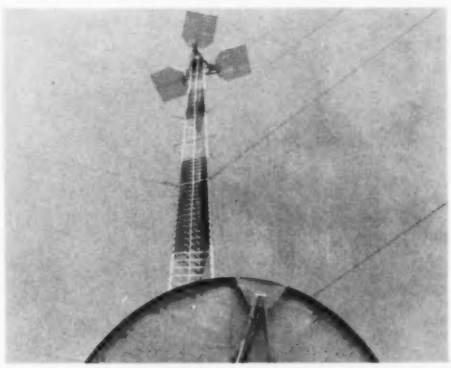
Collins Microwave was installed in the equipment hut (circled portion) before the completion of the new Lincoln Tel & Tel central office and administration building at Lincoln.

All Collins Microwave equipment is racked and pretested under simulated operating conditions before shipment to the customer. Routine maintenance testing is simplified in Collins equipment.

System map of Lincoln Tel & Tel microwave installation gives tower heights and mileage between stations. The installation of Collins Microwave for Lincoln Tel & Tel paves the way for economical future expansion.

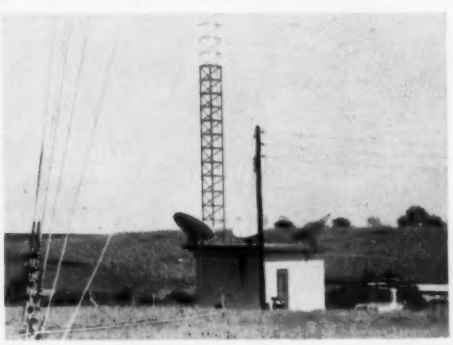


The backside of the Collins parabolic offset feed antenna (foreground) utilized at all stations in the Lincoln Tel & Tel system features a de-icing assembly, which keeps the reflector free of ice during sleet and snow storms.



Paul Henson, Chief Engineer at Lincoln Tel & Tel, recommended expansion with microwave to provide higher quality and more dependable circuits for customers. "Microwave," said Mr. Henson, "has proved to be more economical than expansion by any other type of facility."

The three-way branch microwave repeater station at Brainard utilizes three Collins offset feed antennas for the path to David City, to Wahoo and to Lincoln.



ice wire can be laid on the ground from the pedestal to the house if necessary without crossing any other property. However, some companies think that a terminal on every fourth lot line, depending somewhat on lot widths, may prove to be so much cheaper that it should be selected. Where the method illustrated in *Fig. 2* is being used, a terminal on every fifth house seems to work very well, since a cable and two service wires can be handled nicely with a plow.

The question of how many conductors should be in a buried service wire can best be answered again by the long-term economics involved. A four-conductor wire is quite inexpensive and should, without a doubt, be used for better class homes. It is our opinion that its cost is so small a part of the whole, and future requirements to any particular house are so uncertain, that four-conductor service wire should be used universally. It provides ready facilities for extra telephones for "teen-agers" or for other purposes, and for any proposed uses, such as pay TV, if and when they become realities.

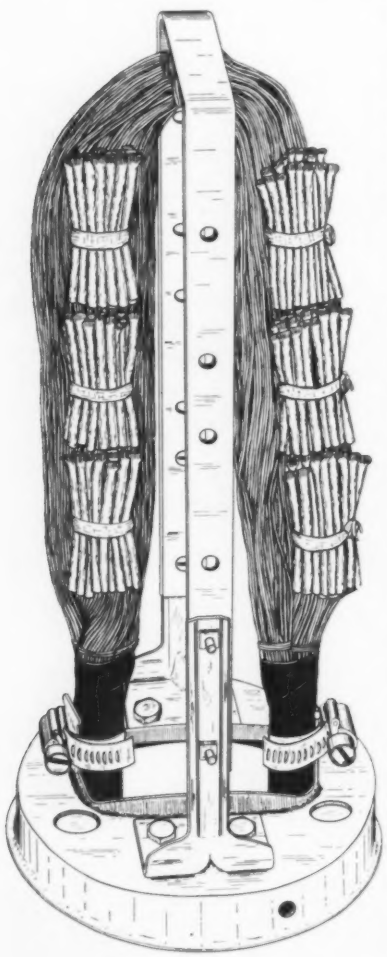


Fig. 8

If a pedestal is placed on every other lot line, either front or back, the telephone service wire can be placed in a direct line from the pedestal to the house, as indicated by the power services from the transformer to the house in *Fig. 1*, or it can be buried in the trench with the cable to a point perpendicular to the house entrance location *(Fig. 1)*.

In the mass-produced subdivision, it is not too important which method is followed. With the direct plan, the service wire is shortest since it takes the diagonal, but more trenching is involved, while the opposite is true when the perpendicular scheme is followed. We believe that the perpendicular plan has some physical advantages, in that, generally, very little planting of trees and shrubs is done in the central part of the backyard. Also, it is easy to locate the service wire if its position can be described as being on a line directly from the point of entrance into the house to the back or front lot line, as the case may be.

We lean toward the perpendicular plan for all types of subdivisions and plan to leave the service wire coiled in the cable trench where it can be found by the installer and trenched directly to the house when it is needed for service. This will involve an advance expenditure for service wire, but it will pay out because of the ease of connection at the later date. Of course, it may not exactly fit the house location, but it will be in the least-likely spot to be damaged.

Polyethylene, or similar plastic insulated cable with Alpeth or similar sheath is probably good enough for most areas, but the added sheath protection of some type of armor may prove worthwhile in zones where rodents are prevalent.

In view of the trend toward single-party service, at least one pair per lot should be provided in the distribution cable, and probably about 1¼ pairs per lot would be better for the low and medium-priced homes. In subdivisions with high-priced homes, two pairs per lot should be provided.

With the ready-access principle, the usual terminal pair distribution problems are obviated and the dome size of the terminal need be sufficient only to care for the size of the cable. Since the pedestal type ready-access terminal is comparatively new and terminating practices are not generally available, we have included *Figs. 4, 5, 6, 7, 8* and *9* to show one type of pedestal type terminal and method of terminating and splicing within it, which will permit full application of the ready-access principle, and one or more pairs at a time may be selected and used.

Fig. 9

This type of buried cable terminal consists primarily of a steel post and post cover, a base plate and a dome cover. Cable and service wires enter through the post and are completely concealed. The base plate is anchored to the top of the post and serves to support the cable, the brackets for the connecting blocks and the dome cover. The base plate also has tabs at each end which provide mechanical support for the cable loop, as well as electrical continuity for the cable sheath. The terminals are available in two sizes, one having an 8-inch dome and the other a 15-inch dome. The 8-inch dome is intended only for terminating small-sized cable. The larger terminal can be used for cables of 1½ inches in outside diameter or less for terminating, splicing or loading.

There are other terminals on the market using the same general design principles.

Cables having an outside diameter equal to 101-pair, 26-gauge or less, are terminated in the manner shown in *Fig. 6*. Although a 25½-inch sheath opening is made, the completed terminal is housed in the 8-inch dome cover. This is accomplished by forming the cable loop into a figure "8" and folding the top down between the cable butts. The conductors are terminated behind the binding posts without cutting, and the excess slack is stored at the top of the main cable loop. This terminal comes equipped with 1—6 pair connecting block. A second block can be added to provide facilities for 12 terminations if required.

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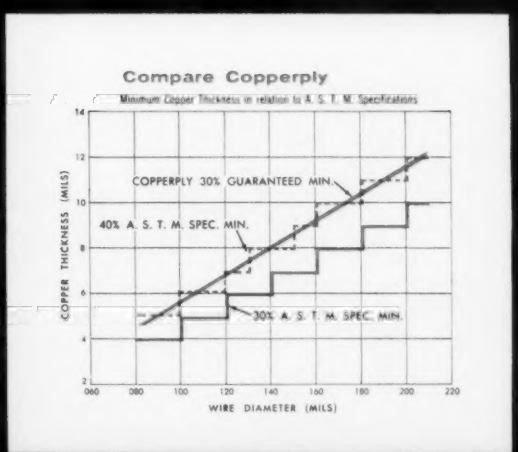
To get all the facts about Copperply, write for Bulletin 202, National-Standard Company, Niles, Michigan.



NATIONAL STANDARD

NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires, flat and tubular braid and wire cord*
WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties* • **REYNOLDS WIRE**, Dixon, Ill.; *industrial wire cloth*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • **ATHENIA STEEL**, Clifton, N. J.; *flat, high carbon spring steels*
CROSS PERFORATED METALS, Carbondale, Pa.; *industrial, commercial, and decorative perforated metals*

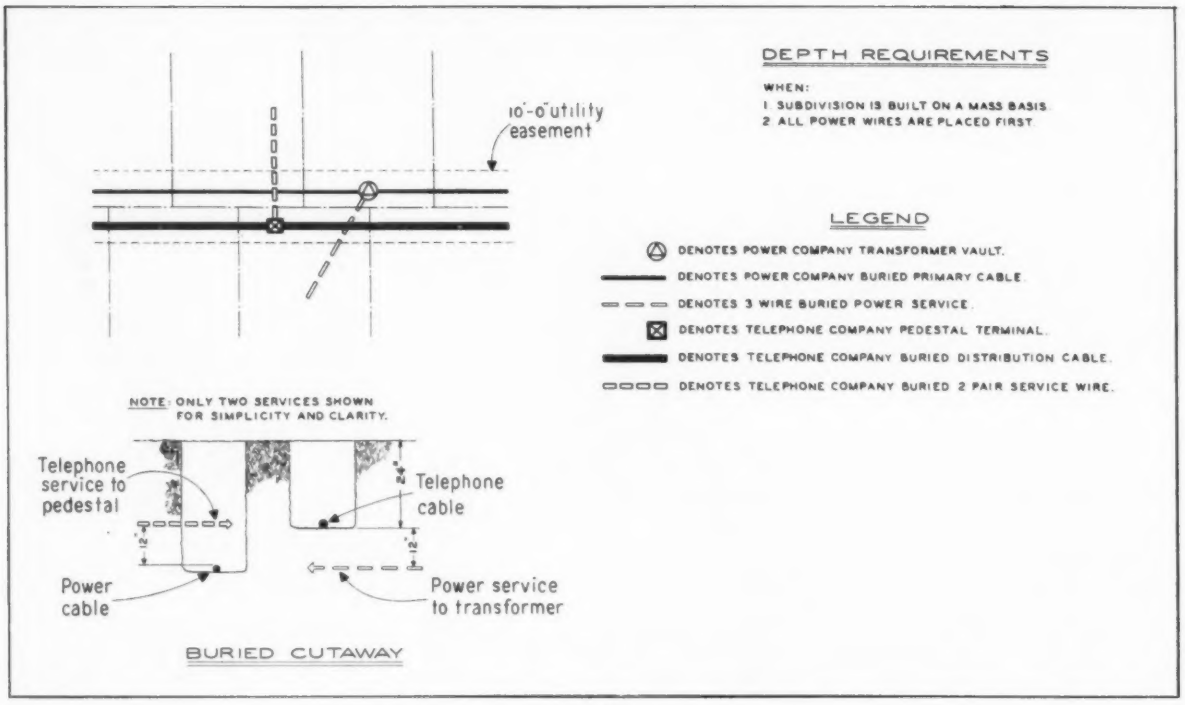

10'-0" utility easement
DEPTH REQUIREMENTS
WHEN:
1. SUBDIVISION IS BUILT ON A MASS BASIS.
2. ALL POWER WIRES ARE PLACED FIRST.
LEGEND
DENOTES POWER COMPANY TRANSFORMER VAULT.
DENOTES POWER COMPANY BURIED PRIMARY CABLE.
DENOTES 3 WIRE BURIED POWER SERVICE.
DENOTES TELEPHONE COMPANY PEDESTAL TERMINAL.
DENOTES TELEPHONE COMPANY BURIED DISTRIBUTION CABLE.
DENOTES TELEPHONE COMPANY BURIED 2 PAIR SERVICE WIRE.
NOTE: ONLY TWO SERVICES SHOWN FOR SIMPLICITY AND CLARITY.
Telephone service to pedestal
Telephone cable
Power cable
Power service to transformer
24"
12"
12"
BURIED CUTAWAY

Fig. 10

Cables larger than 101-pair, 26 gauge, or .82 inches in outside diameter, must be terminated in the terminal having the 15-inch dome cover, as shown in *Fig. 7*. A 25½-inch sheath opening is used. The terminations are made similarly to the smaller terminal except that the figure circle loop is not required. This terminal comes equipped with 1—6 pair connecting block and five more blocks can be added to provide as many as 36 terminations.

The terminal with the 15-inch dome cover provides a splice closure for any cable within the 1½-inch diameter

(Please turn to page 74)

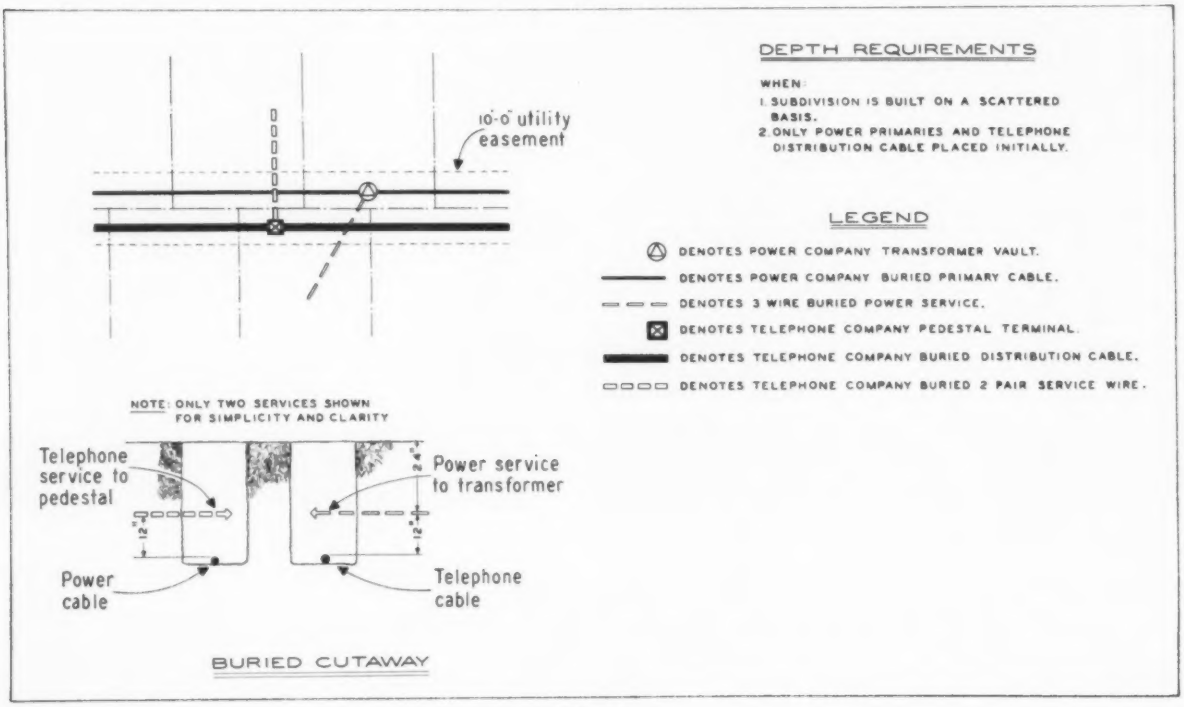
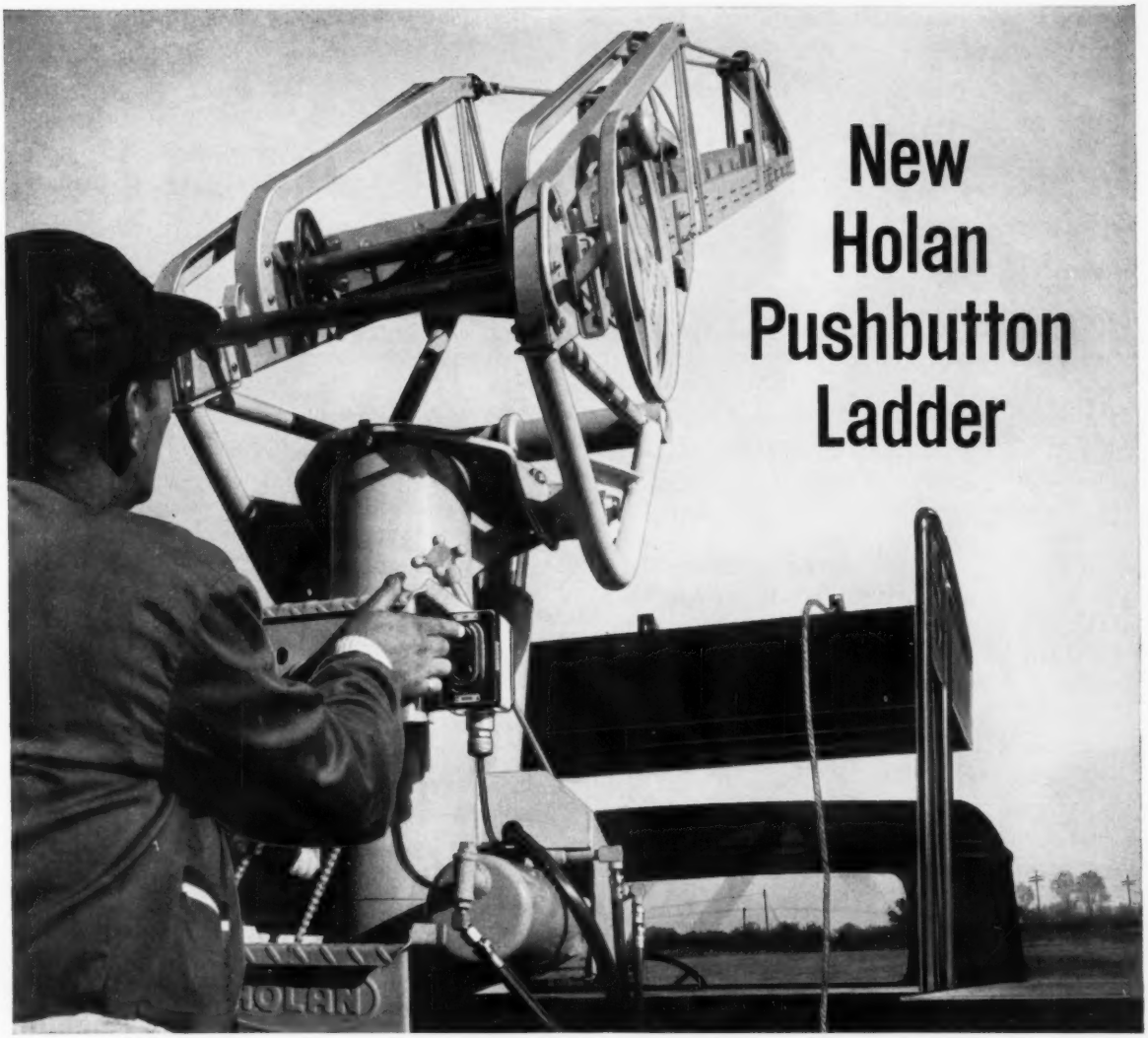

10'-0" utility easement
DEPTH REQUIREMENTS
WHEN:
1. SUBDIVISION IS BUILT ON A SCATTERED BASIS.
2. ONLY POWER PRIMARIES AND TELEPHONE DISTRIBUTION CABLE PLACED INITIALLY.
LEGEND
DENOTES POWER COMPANY TRANSFORMER VAULT.
DENOTES POWER COMPANY BURIED PRIMARY CABLE.
DENOTES 3 WIRE BURIED POWER SERVICE.
DENOTES TELEPHONE COMPANY PEDESTAL TERMINAL.
DENOTES TELEPHONE COMPANY BURIED DISTRIBUTION CABLE.
DENOTES TELEPHONE COMPANY BURIED 2 PAIR SERVICE WIRE.
NOTE: ONLY TWO SERVICES SHOWN FOR SIMPLICITY AND CLARITY
Telephone service to pedestal
Power service to transformer
Power cable
Telephone cable
24"
12"
12"
BURIED CUTAWAY

Fig. 11



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Push a button and the new Holan Series 2600 Ladder goes up; push another button and it comes down. The pushbutton station is on the mast—and a station can be installed on the upper side rail for the man on the platform.

Pushbutton control is just one operating feature. For precise spotting, you have a needle valve with a long handle that enables you to accurately guide the ladder down. You rotate with a crank located directly behind the ladder; this provides a better view for spotting, avoids left-hand cranking and gives maximum clearance between body wall and ladder. And, you crank the fly ladder out *and in* with a windlass.

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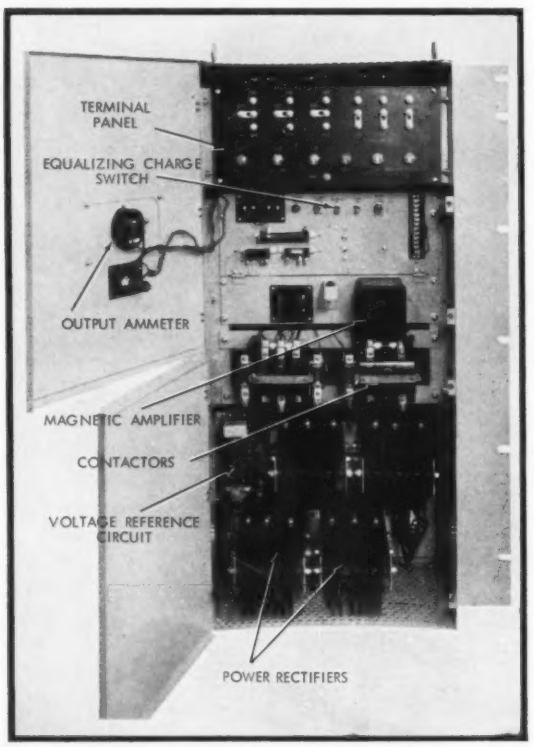

Line voltage changes of ±10% from no load to full load are controlled within ±1%. Life of batteries maintained on "float voltage" at their proper cell rating may exceed 18 years.

POWER SUPPLY OPERATION AND MAINTENANCE. Automatic, completely static charger, with conservatively rated components, is self-protecting and needs no periodic maintenance. Recommended annual inspection is all that is required.

No manual adjustments needed to correct for the effects of rectifier aging. Magnetic amplifier automatically compensates for output variations resulting from changes in circuit characteristics.

SYSTEM PERFORMANCE AND MAINTENANCE. Charger performs at higher efficiency in the normal operating loads of your switchboard, resulting in significant savings in power costs.

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In case of line power failure, a relay in the charger input opens the output circuit and prevents battery discharge back into the AC supply.

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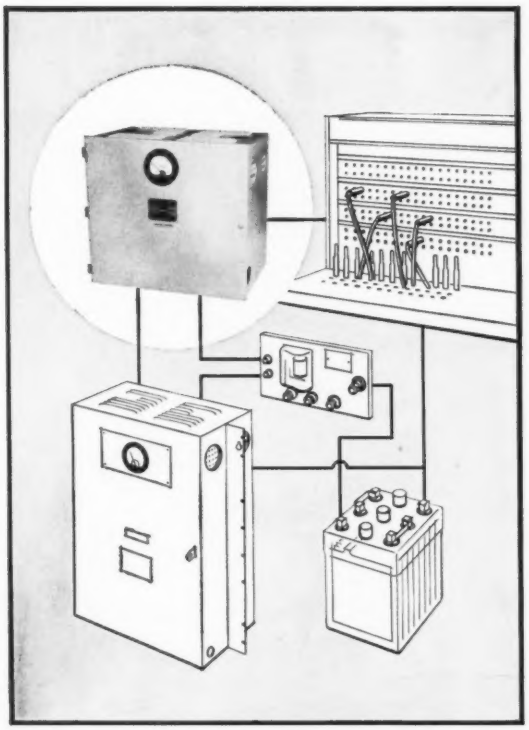

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Economical too! With the help of a Raytheon Auxiliary Charger, an existing installation handles the additional load during the peak demand periods and takes care of "borderline loading" -- too high for the Recticharger but too low to warrant the purchase of a higher capacity charger. System diagram above shows interconnection of Auxiliary Charger, Recticharger, control relay and load. Auxiliary charger is cut in and out of circuit depending on load condition.

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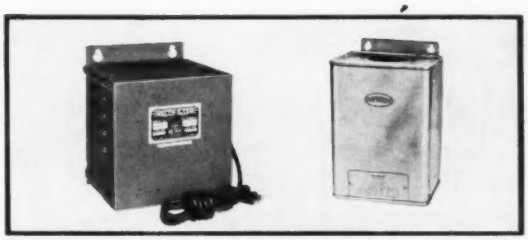
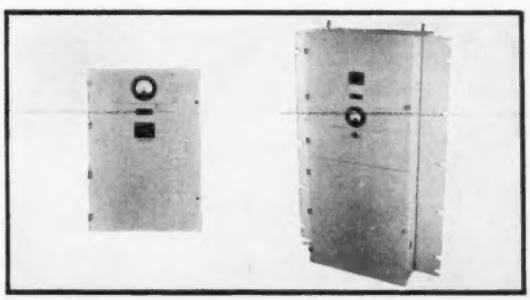


48-volt Rectichargers range from 3 to 400 amps in single and three phase models. Two typical models are shown below -- panel at left, rack-mounted at right.



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It's hard to catch up but...

IT'S EASY TO KEEP UP WITH NEW IDEAS

By FRANK E. LEE

Progress in any industry is determined by the way old methods are improved and the extent to which new ideas are adopted by members of the industry. This article suggests how an operating telephone company—small, medium-sized, or large—can keep up with new ideas, new products and new procedures in the telephone art.

STOP AND LOOK back, just for a moment, at the events that have literally transformed the entire telephone industry. Look at a few of the big things—the central office, common battery operation, automatic switching, carrier, radio relay, Direct Distance Dialing, and machine tabulation. These are only a few of the milestones that mark the route of progress in the telephone industry.

Who made these things possible? For every new idea there is one man (or group of men) who first tried it out. Somewhere there was a first installation. Other men recognized, used, and improved on the original idea—and that has been the pattern of progress. Who are these people? Some of them are still at work in the telephone business, others have passed the heritage to the next generation and even to a second or third.

This is the way of progress. It is good for the soul to sit back for a moment and try to grasp the purpose and meaning of the ever-changing pattern of the industry. It's good, too, to reflect on where one company, and even where a single person, fits into the entire scheme of things.

Demand Here To Stay

Perhaps most interesting of all the elements of the telephone business are the people who use, pay for, and seem to be in continual need of more service. This certainly is a sign of good health in an industry. The public must appreciate good service because it is asking for more and better services. But, this isn't enough in itself. When there is a need, someone should fill the need. If it is a problem of communication, the telephone company should consider if it has the answer. If it hasn't the answer, the telephone company should do everything possible to find the answer.

The public demand for good telephone service is not just a passing fancy. It's here to stay. As new frontiers in know-how and ability are achieved, new objectives will be established. People are becoming more and more dependent on the telephone company for good communications. Good service in the past means demands for improved service today and better service tomorrow.

Once a telephone man realizes that public demand reaches into every state, city, county, town, province and district, then he will realize that his company and he, himself, has a job to do in meeting and filling this demand for new and better service.

What can a small or medium size company do to keep pace with the new trends in the telephone art?

Perhaps the first important step is to realize that any company—small, large, or in between—is or may be affected by the demand for new services. A new school, factory, division headquarters, office, hospital, etc., may decide to locate in the area served by the company. Special lines across the state or area may be needed. Maybe the new enterprise will be a part of a nationwide organization with related problems of being a part of a widespread communications network.

Look at Present Service

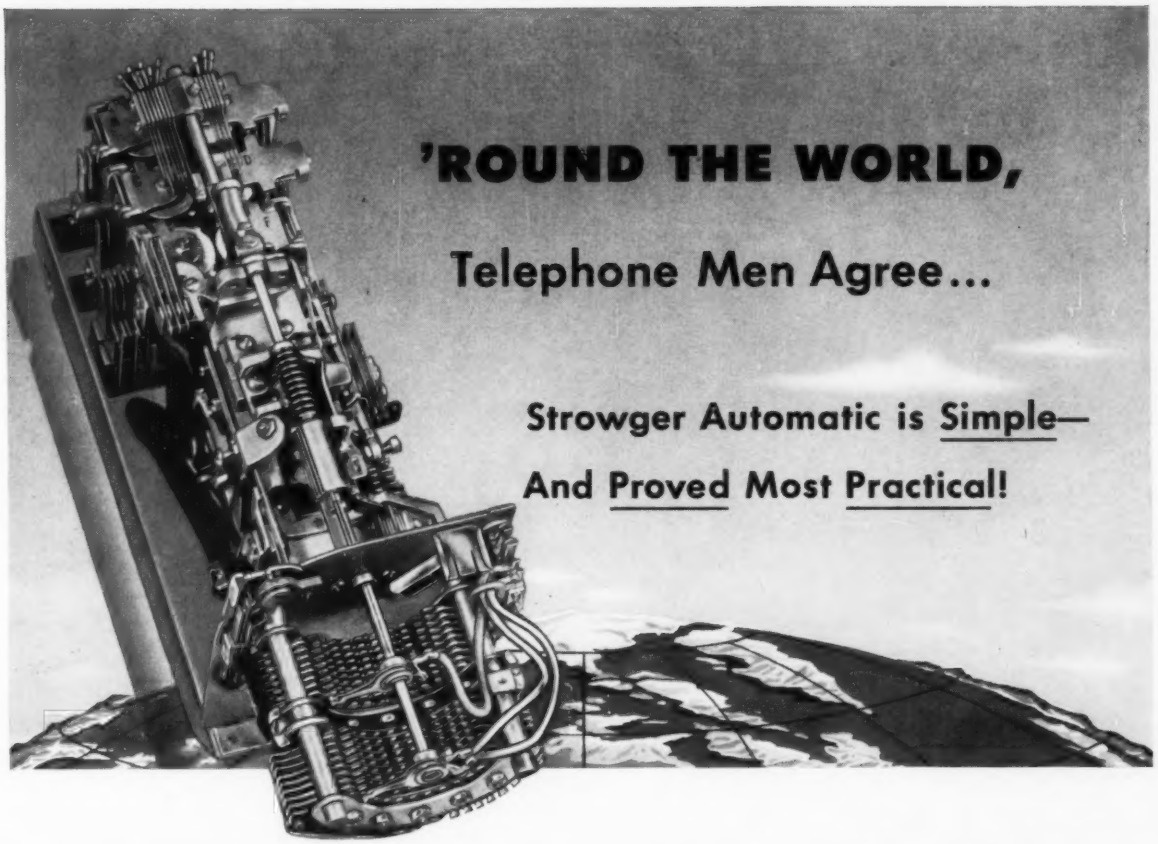
Even without being too much concerned with new business that may come into the area, the demands and needs of present customers deserve careful consideration. Take a good searching look at the present service given by the company. Sometimes it may be a good idea to lay aside company-originated reports, comments, or indexes of service and instead talk with customers and learn what they think as individuals and as a group.

Look into the speed of service. How much time is needed to complete a local call? How much time is needed to complete a long distance call? Are there bottlenecks caused by a lack of facilities?

How good is the service? Are bills rendered on schedule and with accuracy? Is the plant in good repair? Is the directory designed for the customer's convenience? The quality of transmission should be considered in this category, too.

What about the reliability of service? The condition of the plant is an important consideration in answering this question, also.

There are many more elements of the present service that could be mentioned. However, the important thought is that new ideas and progress for the



When you see this switch in action, you see how simple it is. Yet it is the most *practical* telephone switch ever devised. It represents more years of continuous refinement and improvement than any other switch. It has met the test of time, yet is so completely modern it meets every present-day need.

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future are built on the solid foundation of good service today.

Developing New Services

On the whole, the telephone industry adopts changes gradually. This is sound business, but care must be taken that just plain dragging the feet isn't substituted for careful consideration and effective action.

Just to illustrate the impact of a good new idea, here is a brief resumé of how demand for a new service is developed:

(1) There is always a single place where a new device or a new idea is given a first trial.

(2) The bugs are worked out.

(3) The basic idea is proven or disproven.

(4) The market is analyzed.

(5) People talk with people. Telephone people talk with customers. Customers talk with customers.

(6) Soon demand ripples on the surface.

(7) Before long, use of the new service or product spreads. People begin to ask for it—and sometimes in the most unexpected places. The fact that the public never had a service before does not mean their desire for a needed new service is any the less.

(8) After a while, the up-to-dateness and modernness of a company's entire service may be measured, in part, by its ability to provide this special communication need of its customers.

Watch New Developments

The second step in the program of keeping pace with the industry is to keep abreast of new developments:

(1) *Investigate the changes under way today that will be standard service items tomorrow.* Get acquainted with the trend and nomenclature of the new electronic devices and communication equipment.

(2) *Look into the exciting possibilities offered by the new farm communication systems.* These systems offer the opportunity to provide farm customers with equipment to answer every communication need. This includes loud-speakers, radios and telephone console equipment to serve various buildings and areas around the farm, as well as to connect the farm with the central office. A farmer riding his tractor through a stand of hybrid corn on the south 40 soon will be as near a telephone as his wife in her modern kitchen.

(3) *Read about data transmission systems.* This is a highly versatile new method of transmitting vast quantities of information in a surprisingly short length of time. Systems in this category will be developed to handle such complicated procedures as hour-to-hour stock control in all plants, branches, and outlets of nationwide distributors. The service possibilities are fantastic in scope. From the telephone company standpoint, operation will be relatively simple.

(4) *Investigate automatic answering sets.* Learn how automatic answering can be used profitably by all kinds of customers—offices, industry, school, public service organizations, homes and many more. With automatic answering, a customer's telephone is always attended. This means more completed calls and better service to both the calling and the called party.

(5) *Another new field is developing in home communication systems that should be of interest to all telephone companies.* Some years ago a telephone in every home was a service objective. In some places, it still is a goal to work toward. Today, however, the emphasis is on an extension telephone in practically every room. Here and there additional main line service is being installed.

Tomorrow the home will be served by a complete intercommunication system that should be handled efficiently and economically by the local telephone company. This is an important part of telephone service because it means people can talk with people conveniently in the home as well as in an office or in the community as a whole.

(6) *Personal signalling is another new service that will lead to broader and broader concepts of the application of the telephone art.* This service, already being tried in several sections of the country, calls a subscriber to a telephone no matter where he may be. The customer carries a small signalling set with him as he travels about during his routine daily activities.

These sets are even smaller than the new transistor radios. When a call is received for the subscriber a signal is sent from a control center and picked up by the customer's personal set. At present, the customer goes to the nearest telephone to call the control center and complete the call. Some day the call will be completed over the small set carried by the customer.

Some comments have been made as to whether or not this type of business should be handled by the telephone company. Actually, there seems to be no reason why anyone but the telephone company should furnish the service. The long-range signal is similar to a code call system which can be compared with a broadcast signal that someone wants to talk with someone else. The calls in both instances are completed over telephone facilities. In the future the calls may be completed over radio frequencies assigned to supplement wire or carrier circuits. Thus, personal signalling is another new field that can be handled best by the telephone company. These are all reasons why telephone companies should keep in touch with the development of this new market.

(7) *New opportunities are opening for PBX and PABX service.* From all indications, PABX installations are being sold by telephone companies who have never sold such service before. Many of the new PABX switchboards are almost uncanny. They are packed with speedy, efficient service features. An attendant answers incoming calls at a compact, stylish console even smaller than an office typewriter. The literature available on the new PABX units makes interesting, profitable reading.

The developments being made in the PBX field are a good example of how new market potentials can be found in many of the long established services offered by the telephone company.

(8) *Push-button dialing, or more accurately, push-button signalling, is another new development that warrants consideration.* There isn't much difference in the effort required to spin a dial or to push a button. Thus, push-button dialing systems are not being developed with the intention of reducing subscriber effort in making a call. Instead, they will use multi-frequency tones similar to the tone signals used on long distance and similar circuits. Thus, the ultimate goal is to extend the signalling range of telephones used in an exchange area.

In the future, a central office will serve a considerably larger geographic area than is possible with even the best equipment available today. The possible future savings in capital investment is a good reason why a telephone company should keep in touch with the progress being made in developments of this type.

(9) *Improvements are also being made in the materials and equipment used in the day-to-day job of furnishing economical, trouble-free service.* For example, consider the many fine new ideas in cable construction that have been introduced in the past few years. These changes can be seen in the plastic insulated cables that have become so popular. New cable suspension systems have been developed. There are even new and better ways of supporting and splicing suspension strand. Then there are the new methods of installing underground wire and cable plant.

New ideas have been adopted to provide improved protection for the telephone plant at less cost. The new telephones, telephone booths, and a host of other improved products are constant reminders that manufacturers, laboratories, and telephone companies themselves are continuing their combined efforts to provide better service at the most reasonable cost.

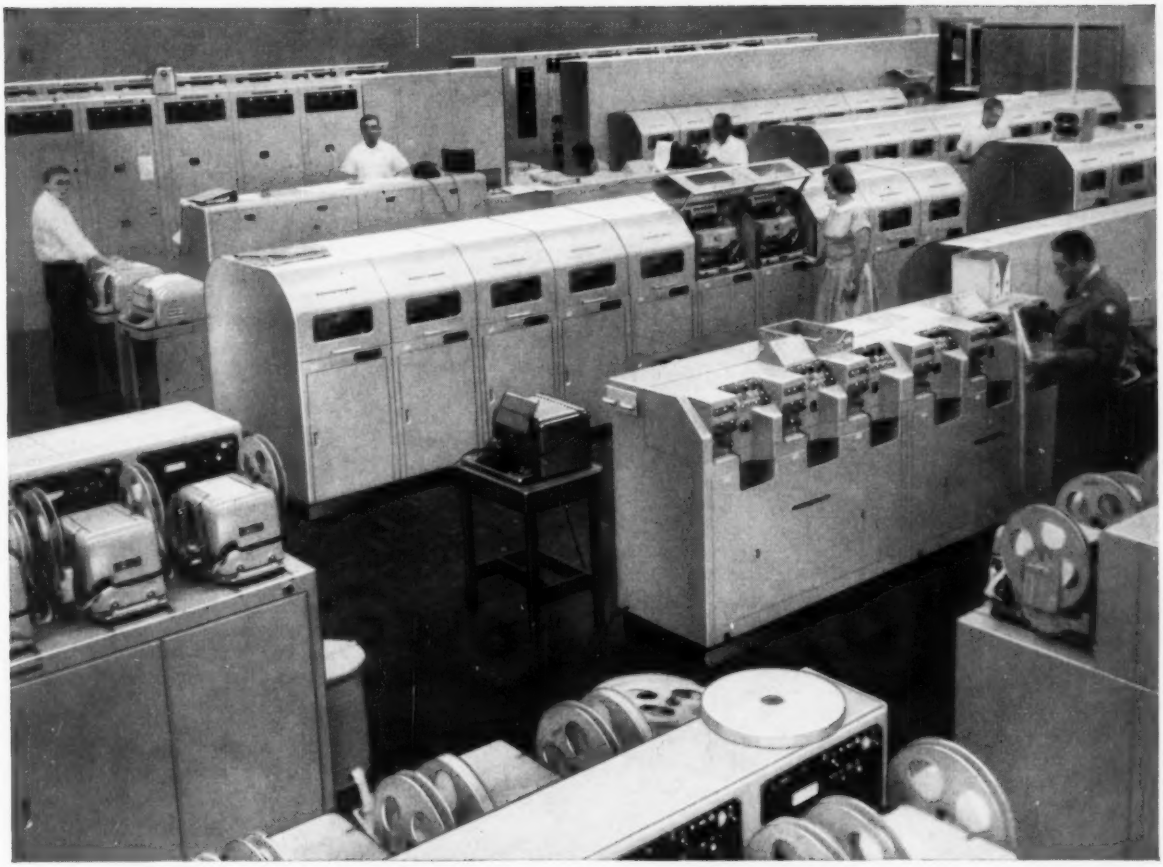
How To Follow Progress

What can the small or medium-sized company do to keep abreast of progress in the telephone industry?

If a person could sleep for 20 years —like a modern day Rip Van Winkle— he would be astounded at developments made in the telephone field while he was sleeping. He would recognize the function and purpose served by the business. However, some of the methods and devices would be quite strange, indeed. The primary function of the telephone art—people talking with people, or people communicating with people—will be the same 20 years from today as it is today. The same statement could be made if a person were to turn the pages of history back to the early 20th or late 19th century.

A big new factor of the future is that machines will be communicating with machines. The machines will still be under over-all human control. However, for all routine problems, programmed in advance, the machines will accumulate, send, receive, and act on

(Please turn to page 84)



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Research and development of equipment for transmitting and receiving printed communications has been a continuing project at Kleinschmidt for almost 60 years. This unparalleled store of experience, now joined with that of Smith-Corona Inc, holds promise of immeasurable new advances in electronic communications.

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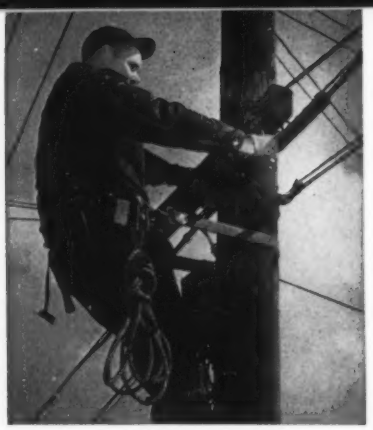


THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THIS COUNTRY is blessed with a universal telephone system, the largest and the best in the world. Each Independent company, large or small, is a part of that system. A chain is never stronger than its weakest link so all telephone systems should be engineered, constructed and maintained in such a manner as to insure an acceptable standard of service.

If a customer on a coast-to-coast call has a bad circuit due to the called station being on a noisy rural line, he does not blame a small operating company but condemns the system as a whole. Most large Independent companies have done a good job in providing service for most localities. But some of the smaller companies have at times been a bit neglectful in maintaining the proper grade of service. In recent years, however, there has been a marked improvement and our industry can be justly proud of the progress that has been made.

It is most important that this work continue at this time. This is made necessary by the fact that there is at present a mass migration from the downtown sections of many large cities to the surrounding suburbs. In many cases this results in an increase in business for the small Independent operating companies.

We know of one case in which a large new commercial airport is being constructed in an area operated by an Independent company. A new town is certain to be built in the near vicinity of this airport. Then, in addition, offices and factories are moving from the cities into suburban areas in large numbers. The workers in these establishments always make an effort to build homes so that they may live near their work.

There are many reasons for this mass migration to the country. In the event of enemy bombings, large centers of population are certain to be the first targets. Moreover, good roads, electricity, communication and the automobile make country living more desirable for many people than city dwelling. In addition, when a manufacturer has a need to build a new plant or enlarge an old one it often proves more economical to build in a suburban area where costs are lower than in the downtown section of the city.

When a concern moves from a city into a suburban or rural area, it will probably demand the same class of service to which it has been accustomed. This requirement, however, should not alarm any small company serving such an area, for it will prove to be good and profitable business if handled properly.

There is a general tendency throughout the country for an upgrading of telephone service. The rural line, with 20 or more stations, has outlived its usefulness in most sections of the country. An eight or 10-party line may not be able to handle present-day traffic in many cases.

We believe that the time is not far distant when a four-party line is the most stations per line that will be tolerated anywhere and two-party and individual line service will be required by the great majority of customers. Customers use their telephones so much in this day and age that they cannot tolerate heavy station loaded party lines.

When a small or medium-sized Independent telephone company is faced with a requirement for a sizeable expansion and upgrading of service, careful planning is necessary. Perhaps the central office switching equipment should receive first consideration. Should the present equipment be expanded to care for the new requirement or shall a satellite exchange be provided?

In some cases, it may prove desirable to replace the present central office equipment with a new and more modern exchange. If the present equipment is manual this is definitely the proper action to take. If automatic equipment is involved, the age and type of the present exchange should be taken into consideration.

How about the building in which it is to be installed? Is there room for the additional equipment required and, if not, can the building be expanded?

Because of the rapid increase in service requirements in most areas during the past several years many exchange buildings are now entirely too small. Furthermore, many of them were not designed and constructed with a view of later expansion. This is unfortunate and may make the construction of a new building necessary.

The use of a small automatic satellite in the vicinity of the new service requirement often proves desirable and economical. In many cases, space can be obtained in a factory or office building to house this equipment. If not, a small building to adequately house an unattended exchange can be constructed in most areas at a fairly reasonable cost. The satellite exchange may also permit a considerable saving in outside plant costs.

This is especially true when a new activity in an isolated area requires a considerable number of telephone stations. The use of a satellite may also involve only minor changes in your present central office equipment to care for the increased traffic.

When a new concern moves into a suburban area perhaps the first request for service will come from the building contractors. About the same time, however, the officials of the new firm will inquire as to when they will be able to obtain the required telephone service.

Actually, these people should and sometimes do check on the available telephone service before deciding to locate in a fringe area of any city. Usually though they just assume that the required service will be available when they need it.

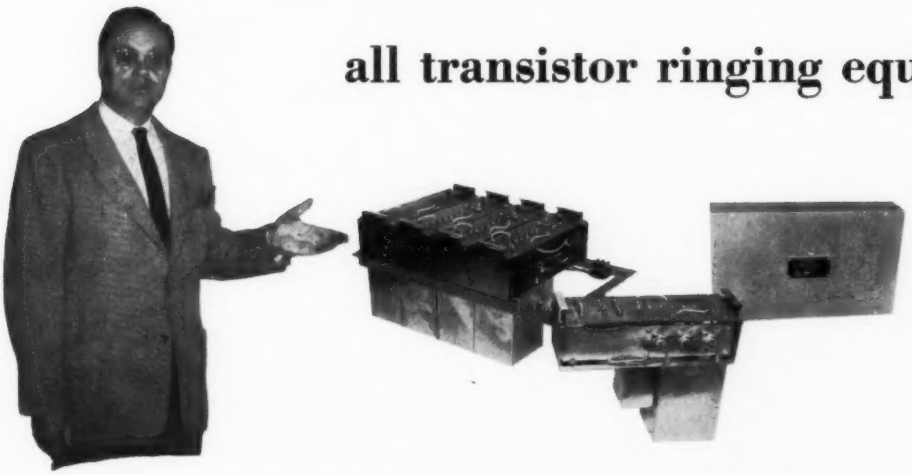
It is always a good idea to make a

(Please turn to page 96)

MEMBER

NEW

all transistor ringing equipment



Combining the latest developments in electronics with more than a decade of leadership in ringing equipment design and construction, ESCO now offers small and medium exchanges two new 25 and 50 watt multiple-frequency all-transistor ringers.

Using fewer transistors than any other similar equipment, ESCO transistor ringers are designed to take fullest advantage of the extremely long life and high reliability inherent in semi-conductor devices. Use of simple, proven circuits and a minimum number of components further insures utmost dependability, higher operating efficiency and minimum power drain from the 48 volt station battery.

Compact modular ringer construction gives quick, easy access for installation and maintenance and reduces rack height to a space-saving 10½". Five circuit modules in each ringer provide 5 synchromonic, decimonic or harmonic outputs stabilized within .167 cycles. Output taps for 85 to 175V are provided. Accidental shorts across output will not overload or damage the equipment.

Replacement of a single capacitor in the module changes frequency to give maximum interchangeability of modules, widest equipment versatility and minimum spares requirements.

For your next expansion and modernization, look into all the advantages of ESCO transistor ringing equipment — also, get the facts on ESCO's complete line of motor-driven tone alternators, interrupters, ringing assemblies and power sources, designed and manufactured for telephone men by telephone men with years of experience in the industry.

Write today for full information.

ELECTRIC SPECIALTY CO.
176 South Street, Stamford, Connecticut

Esco alternators, interrupters, pile-ups, drive motors, and other components are also included in installations by prominent suppliers like Automatic Electric Co., Kellog Communications Division of I.T.T., Leich Sales Corp., North Electric Co., Stromberg-Carlson Co.

THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

FOLLOWING the midterm graduations, many young girls will be entering the business world for the first time as wage earners and telephone companies will obtain their quota of these youngsters.

It is refreshing to have them enter the industry bringing with them new viewpoints on life, and they can be a stimulus to the older employes if older employes accept these youngsters in the proper spirit. It is true they will require guidance and a good example on the part of the experienced employes to get started on the right track. But, we can hardly expect them to conduct themselves in the proper manner, if we fail to do so ourselves.

Many of the youngsters entering the business world today will be the career women of the future and telephony has much to offer for the youngster who is seriously interested in making this field her career.

We know, of course, that many of these young women are planning to make marriage their career, and rightly so. But, if their Prince Charming fails to make an appearance, they will be well started on a successful career for the future. It has been stated, if Prince Charming has not appeared before a girl is 25, she had better give serious thought to her career. This will not deprive her of matrimonial opportunities. If she retains her femininity, her additional knowledge of a man's world in business should actually make her a more interesting and understanding wife. The writer would like to add to this thought an observation from her years of experience in the telephone field. In her opinion, telephone women make excellent wives because of the nature of their work and the training this work requires.

For the benefit of some of the younger people who may have an occasion to read this article, and as a "refresher" for our experienced employes, the writer would like to review a few of the things that are important in getting ahead on the job in the field of telephony, or in any other field.

DISCRETION—Knowing when and how to mind her own business, respect confidences, and maintain golden silence should be a fine art practiced by all female employes. Never gossip. The damage it may do is unpredictable. Each time a statement is repeated, it is altered by words, voice intonations, or gestures. The girl "in the know" keeps quiet. It's the one who doesn't know who shows it.

GOOD SPORTSMANSHIP—This sterling quality is frequently lost in the storm of feminine jealousy, especially when a girl gets a promotion. You may have heard the saying, "When A Fellow Needs A Friend." This is often true when a promotion is received, and much of the joy of attaining the promotion is frequently lost by the envy of others who probably could, but did not make the effort to, succeed.

GOOD TELEPHONE MANNERS—Being engaged in the field of telephony, it is essential for an employe to develop good telephone manners off the job as well as on the job. A pleasing, warm, sincere voice with a smile is a valuable asset in any business, but particularly so in the telephone field where customers do not see the person serving them.

A SENSE OF PROPRIETY—Appropriate dress for the office is important. Jangling jewelry, strong perfume, heavy makeup, and dressy dresses are not appropriate for office wear. One's personal affairs should come in for a minimum of office discussion.

LOYALTY—If a girl does not like her work well enough to be enthusiastic about it and is constantly complaining about everything in general, her hours, the company, her wages, Sunday work, her co-workers, she just does not fit into the organization and she, and her company, will do much better without her service. One dissatisfied, disgruntled employe is like that bad apple in the barrel. She will affect the rest of the employes unfavorably. There is an old saying, "If you don't like your job, quit!" That saying still holds true. The employe is unhappy, the company is not pleased with her work and, if she makes the effort, she can find a job she enjoys doing.

SUCCESS—This is not attained without sacrifice. Even though a girl may only intend to work until she has an opportunity to marry, she should take every opportunity available to become an efficient, worthwhile employe. If she marries, it may be one of those unfortunate affairs which do not last, or, sickness in the family, or other reverses may make it necessary to seek employment again. If she has been a satisfactory employe in the past, her opportunities for re-employment are much greater.

DRIFTING—"A rolling stone gathers no moss." A floating employe rarely ever attains success in any field. Youngsters should decide what they wish to do, and then stick to their goal. Jobs are not as plentiful right now as they have been. You must *seek* instead of being *sought after*—there *is* a difference.

Traffic Questions

(1) If a customer in placing a long distance call with a local operator indicates that it is an emergency call, how should the local operator proceed?

(2) Are calls to Hawaii considered overseas calls?

(3) How are calls to Hawaii ticketed and timed?

(4) What is the timing allowance on calls to Hawaii?

(5) Do report charges and messenger charges apply on calls to Hawaii?

Answers are presented on page 89.

Can Happen Here

One person dies accidentally on the job every 37 minutes. A work injury is suffered every 16 seconds.

TEL-U

RDC

TEL-CW

COMPOSITE

PLW

DB-S

DB

TEL-PCP

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Install It & FORGET IT

BATTERY CHARGERS

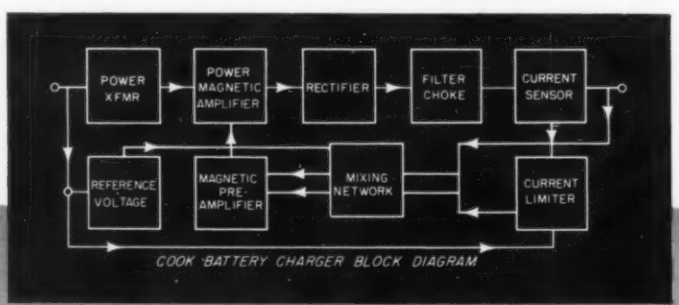
by COOK

WITH DIODE POWER RECTIFICATION AND TRANSISTORIZED VOLTAGE CONTROL

THE Cook battery charger is of the constant voltage type having a rated output of 49.5 to 53.7 volts for use with 23, 24 and 25 cells. The 12 amp and 24 amp models can be operated from a 110 volt or 220 volt single phase supply. The 25, 50, 75, 100, 150, 200 and 400 amp models are operated from 208 or 220 volts 3 phase supplies. The charger is of the magnetic amplifier type and does not use vacuum tubes, gas filled tubes, or motors whose life is restricted.

This charger will supply a closely regulated floating voltage of 2.15 volts per cell within the maximum optimum current charging range of the battery. When needed battery equalizing can be obtained through the use of a toggle switch mounted on the control panel which increases the regulated charging voltage to 2.33 volts per cell. Floating and equalizing voltages are regulated by a magnetic amplifier to within $\pm\frac{1}{2}\%$ for variations in line voltage and load. Under all conditions a current limiter restricts the maximum available current to a safe preset value without releasing the breaker.

A transistorized model of the Cook Charger also is available. This model features a transistorized voltage control circuit and voltage reference in conjunction with magnetic power amplifiers and hermetically sealed silicon rectifiers. The performance of this model is com-



COOK BATTERY CHARGER BLOCK DIAGRAM

DESIGN FEATURES

COMPONENT DESCRIPTION . . . Cook chargers use basic electrical and magnetic circuits and dependable extended life components such as hermetically sealed, solid state, silicon rectifiers and transistors, vacuum-impregnated transformers and reactors, vitreous-enameled wire wound resistors and potentiometers, and proven circuit protectors.

POWER TRANSFORMER . . . Transformers of Cook Telephone Quality, vacuum impregnated with conservative temperature rises . . . AC voltage supply taps accommodate standard range of voltages.

MAGNETIC AMPLIFIERS . . . Designed for long life and efficient operation and made to Cook Telephone Quality . . . precisely laminated and vacuum-impregnated to operate silently.

CURRENT LIMITER . . . Precisely constructed by Cook to Telephone Quality from special laminations to insure minimum temperature rise and long life, trouble free operation.

VOLTAGE REFERENCE . . . Automatically maintains a stable reference voltage which controls the output regulation.

FILTER CHOKE . . . Laminated and vacuum impregnated choke made to Cook Telephone Quality standards insure extended life, improved power factor, ripple output and minimum noise.

CONTROL RESISTORS . . . Wire wound, vitreous-enameled quality resistors.

CONTROL DIODES . . . Hermetically sealed silicon diodes derated to a fraction of their power and current ratings serve as primary control for the current limiter and output voltage regulation.

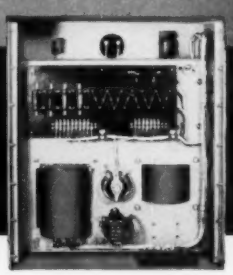
OTHER COMPONENTS . . . Indicating Instruments, Switches, Fuses, Circuit Breakers and other components are selected to meet Cook Telephone Product Quality . . . No charge alarm relay is optional.

CABINET . . . Rigidly constructed steel cabinet, finished in attractive grey hammerloid. Overall dimensions 30" H x 23" W x 14" D. Provisions exist for wall or rack mounting.

SILICON POWER RECTIFIER . . . Low forward drops (as compared to selenium rectifiers) reduce size of the magnetic components . . . hermetic sealing increases life and efficiency of rectifiers.

A view of the Cook Battery Charger with the lower front panel removed.

Rear view of the unit.



parable to that of the all magnetic controlled charger.

Cook chargers are completely enclosed in a rigidly constructed steel cabinet and attractively finished. Mounting and installation provisions are based on standard rack mounts. These units do not necessitate forced cooling because of incorporated design features which result in silent dependable operation. All controls, connectors and fuses are conveniently located inside the cabinet.

The Cook charger is a solid state device with excellent voltage regulation produced by a closed loop magnetic amplifier. AC voltage is supplied through an isolation transformer to a power magnetic amplifier whose output is rectified by silicon rectifiers and then filtered. The resulting output voltage is compared to a standard reference voltage and any difference between these voltages is instantly sensed by a magnetic preamplifier. In turn, the magnetic preamplifier automatically adjusts the output delivered by the power magnetic amplifier so as to maintain constant the output voltage. A current limiter overrides the voltage control whenever the current approaches a preset safe limit and keeps the load current below this limit.

Battery charger efficiency is held between 70% and 75% from 25% to 125% of rated load. This high efficiency results from the use of hermetically sealed silicon power rectifiers, which have a low forward drop (as compared with selenium rectifiers), and the incorporation of a closed loop control circuit.

No periodic adjustments are needed for silicon rectifiers as compared to selenium rectifiers which age with use. Reduced size and weight of all components result from the use of these proven solid state rectifiers.

Lack of any moving or vibrating parts insures extended life and no operating noise.

COOK ELECTRIC Company

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Virginians Told To Increase Sales, Keep Adequate Records

By Dianne P. Drucker

THE COMPANY that is able to increase its annual revenues through an increase in the sales of its services, and that can obtain an adequate rate of return through being able to offer to the commission complete records, is one that will keep both feet on the ground in spite of inflation, members of the Virginia Independent Telephone Association were informed at their convention on Oct. 30 and 31 in Roanoke. Harry P. Cavendish, president, of Harrisonburg, presided. At the second day's session Warren B. French Jr. of Edinburg was in charge.

Explaining how "You, Too, Can Sell," E. P. Kittinger, of Tarboro, N. C. staff assistant—commercial department of the Home Telephone & Telegraph Co. of Virginia, Alberta, referred to aggressive selling by plant department installer-repairmen.

He spoke about the sales made by 175 installer-repairmen of the Carolina Telephone & Telegraph Co., Tarboro, N.C., whose successful program he used as an example. With some help from non-contact employes, these men in the past six months, have made the following sales, increasing the annual revenue of the company by $340,678:

Discussing some of the day's events at the Virginia Convention are Wilson B. Garnett of Charlottesville, Stanley A. Owens of Manassas, and Richard F. Hardy of General Telephone Credit Co., Inc., New York City.

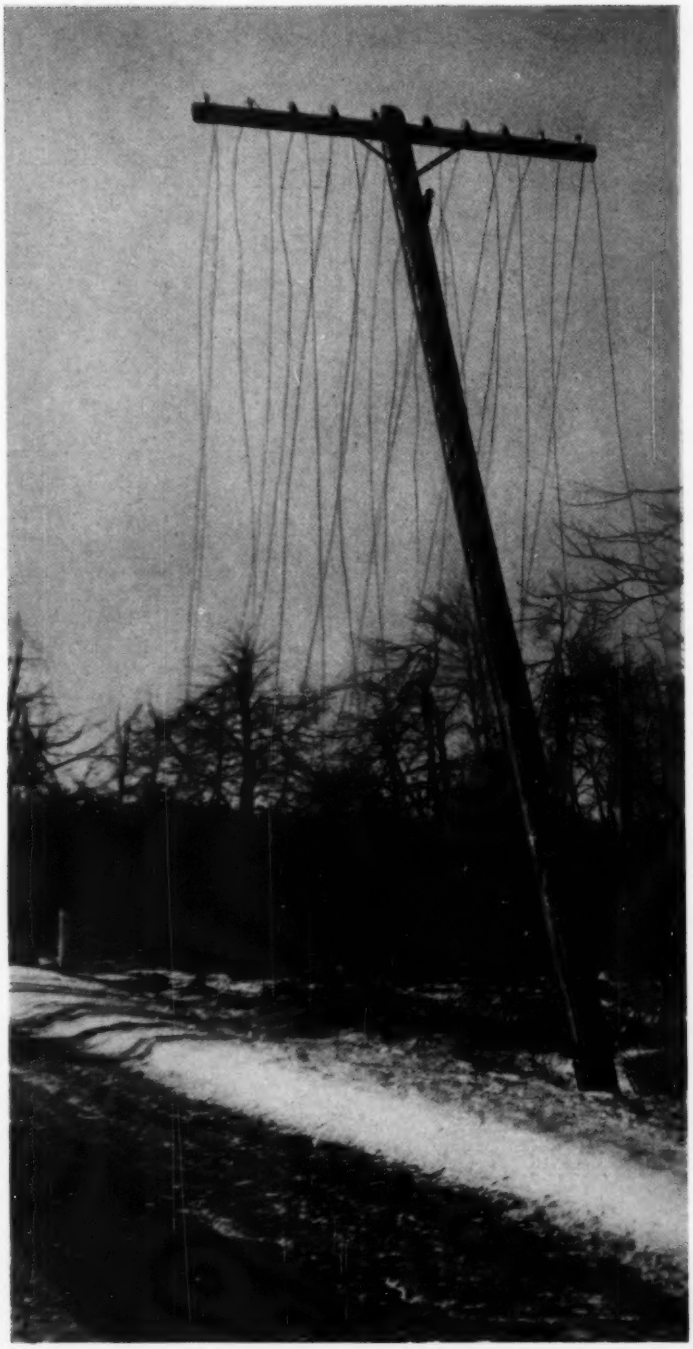
Extensions	1338 or	2 per 100 visits
Main stations	3292 or	5 per 100 visits
Spring cords	4233 or	6 per 100 visits
Color sets	299 or	.4 per 100 visits
Other items	2384 or	3.5 per 100 visits

Selling by plant men is a logical de-

Continued from page 47

Officers and directors of the Virginia Association are shown, standing, left to right, A. E. Reynolds of Bristol, Tenn.; L. John Denney of Amherst; Frank A. Hoffman of Bluefield, W. Va.; P. T. Campbell of Hanover; W. B. French Jr. of Edinburg; L. Vernon Snyder of Lexington, and A. G. Stogdale of Staunton. Seated, left to right, are C. Lacey Compton of Manassas, secretary-treasurer; C. J. Logan of Tarboro, N.C., president; Harry P. Cavendish of Harrisonburg; W. B. Garnett of Charlottesville, first vice president; and Virl L. Choate of Martinsville, second vice president.

Rely on Graybar...



ESPECIALLY IN EMERGENCIES

Graybar's long experience in serving the every day needs of telephone companies is especially valuable when lines go down.

A nation-wide network of Graybar offices and warehouses provide ready accessibility to stocks of essential telephone supplies. You can depend on the fastest possible deliveries of emergency replacement items — wherever and whenever they are needed.

Experienced Graybar personnel have developed the know-how needed to initiate immediate action and efficient follow-through from working closely with telephone companies daily and through emergencies of all kinds.

Moreover, Graybar is totally owned by its operating and retired personnel. That's why you're sure to get, especially on emergencies, *personal* service from people who have a *personal* interest in giving you the assistance you need, when you need it.

610

Graybar Electric Company, Inc.
420 Lexington Avenue, New York 17, N. Y.

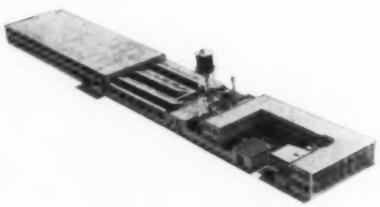
Call Graybar first for...

IN OVER 130 PRINCIPAL CITIES

SINGLE SOURCE buying is

(ask your wife)

Years ago, folks had to shop at a number of stores to fulfill all their needs. Today, the modern supermarket and shopping center has made it possible to buy from a single source. Telephone folks too, have found that single source buying saves them more time and money than before. It also makes for greater efficiency in operating their company. Whatever your needs may be—tools, hardware, protection equipment, aluminum telephone booths, insulated wire, etc.—Leich can serve as your single source for all supplies and materials. When you buy from us, you can rest assured that every item has passed a rigid test to prove its merit and every new product has been carefully investigated. You can also depend on Leich as the source to give you fast, prompt service on every order. Next time you order supplies, use the *single source* that will offer you the most for your supply dollar . . . LEICH.



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Preformed Dead-Ends and Guy-Grip dead-ends hold full rated strength of strand

These dead-ends won't relax their tight grip. Once on, the only way to remove Preformed dead-ends or Guy-Grip dead-ends is to do so intentionally. Because of the non-slip grip and because there are no concentrated stresses and no fatigue points, your guy and messenger strands are 100 per cent safe.

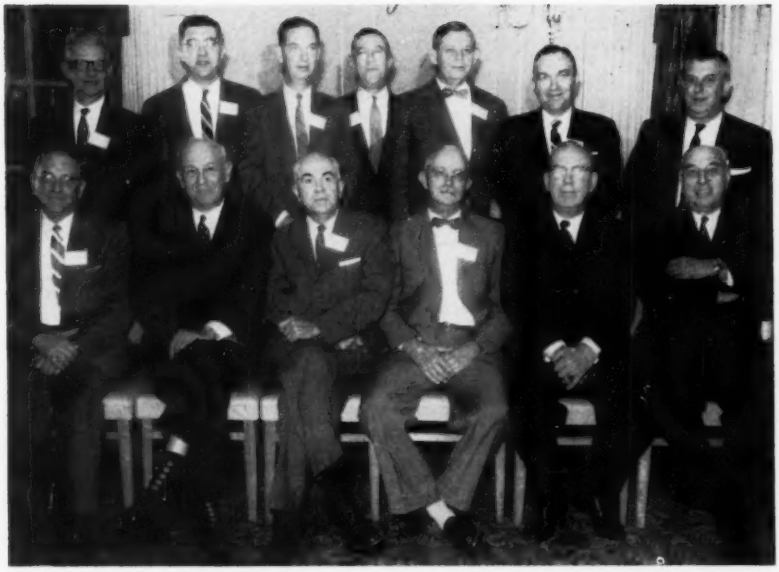
Some other advantages are apparent, too. For instance, you will notice that, with Preformed, you dead-end the B-rural messenger without cutting it. Other dead-ends require cutting and some require tools for application. Also, Preformed makes it possible to go around corners without splicing.

If your dead-ending doesn't look as neat as this, if it doesn't go on as easily and assure safety, or if you have to keep checking to make sure it's holding, write PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Ave., Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead-ends, Guy-Grip dead-ends and other line accessories.

PLP

You can look to Preformed

Made in accordance with or for use under one or more of the following U. S. Patent Nos.: 2,761,273; 2,609,653; 2,275,019; and 2,587,521. Other patents pending.



Posing for a group portrait are these 13 past presidents of the Virginia Independent Telephone Association. They are (seated, left to right): W. C. Darrow of Tarboro, N.C.; F. T. Prufer of Staunton, Va.; A. E. Reynolds of Bristol, Tenn.; W. J. Holloway of Smithfield, F. G. LaPrade of Martinsville, and J. P. Borden of Charlottesville. Standing, left to right, are Frank C. Switzer of Harrisonburg, Dennis B. Draper of Staunton, Garland T. LaPrade of Martinsville, W. G. Robertson, formerly of Warsaw, now of Southern Pines, N.C.; Duane T. Swanson of Charlottesville, Kermit S. Land of Pungo, and Lloyd C. Pulley of Warsaw.

velopment, Mr. Kittinger said, for the following reasons:

(1) Installer-repairmen have been invited into the subscriber's home.
(2) While performing this work, they are in a position to size up the subscriber's situation and determine whether this subscriber's service is adequate.
(3) They are in positions to make recommendations and install the service on the spot.

To initiate such a plant selling program, the plant department, first of all, should coordinate its efforts with the commercial department, according to Mr. Kittinger.

Next should come a sales training course, whose subject areas, concerning subscriber relations, he outlined as follows:

(1) Courtesy.
(2) Proper method of greeting the subscriber.
(3) Proper conduct while on subscriber's premises.
(4) Proper exit.
(5) Appearance.

Concerning sales techniques, the course's subject areas are:

(1) Greeting the subscriber.
(2) Determining telephone requirements.
(3) Making a recommendation.
(4) Closing the sale.

Carolina T & T initiated weekly follow-up training meetings, Mr. Kittinger said, to further teach sales techniques and to maintain a high degree of interest in the program.

Employe sales are reported in such a manner as to give recognition to individuals, exchanges, and districts.

He concluded his report with the findings that the company had discovered the plant men to be enthusiastic over the program and eager to sell. He reported that they say the program has helped give them confidence, helped their personalities, and has given them an opportunity to demonstrate their initiative and ability.

Companies, who wish to keep their earnings at a realistic level, also need to keep adequate reports, according to John E. Pittman of Durham, N.C., who discussed "The Value of Statistical Information."

He used the need for being able to answer questions like—How much does it cost to set a pole?—What is our maintenance cost per station?—What did we earn last month?—to demonstrate the value of statistical reports for management in their day-to-day operations. The basic information necessary for statistics, he said, comes from a balance sheet and income statement.

According to Mr. Pittman:

"One of the most useful tools to management, in reference to the balance sheet, is a comparison of the accounts a year ago. The change reflected . . . is a valuable guide in understanding the effect of operations.

"Certain other comparisons should be made, such as the amount of telephone plant in service per telephone. A rapid increase in investment per station, should direct attention to earnings requirements per telephone, which must be kept in balance with investment to assure a proper rate of return.

"A computation, showing the ratio of depreciation reserve to telephone plant in service, should be made periodically, so that the resulting percentages may be compared on a continuing basis. Another comparison helpful to management is the ratio of the reserve for uncollectible accounts to the amount due from customers and agents . . ."

A company learns a great deal about the soundness of its structure from the balance sheet, Mr. Pittman said. From net operating income, a company can judge whether it is operating in an efficient manner, and, he added, a good way to judge the soundness of a figure is to compare it with previous years.

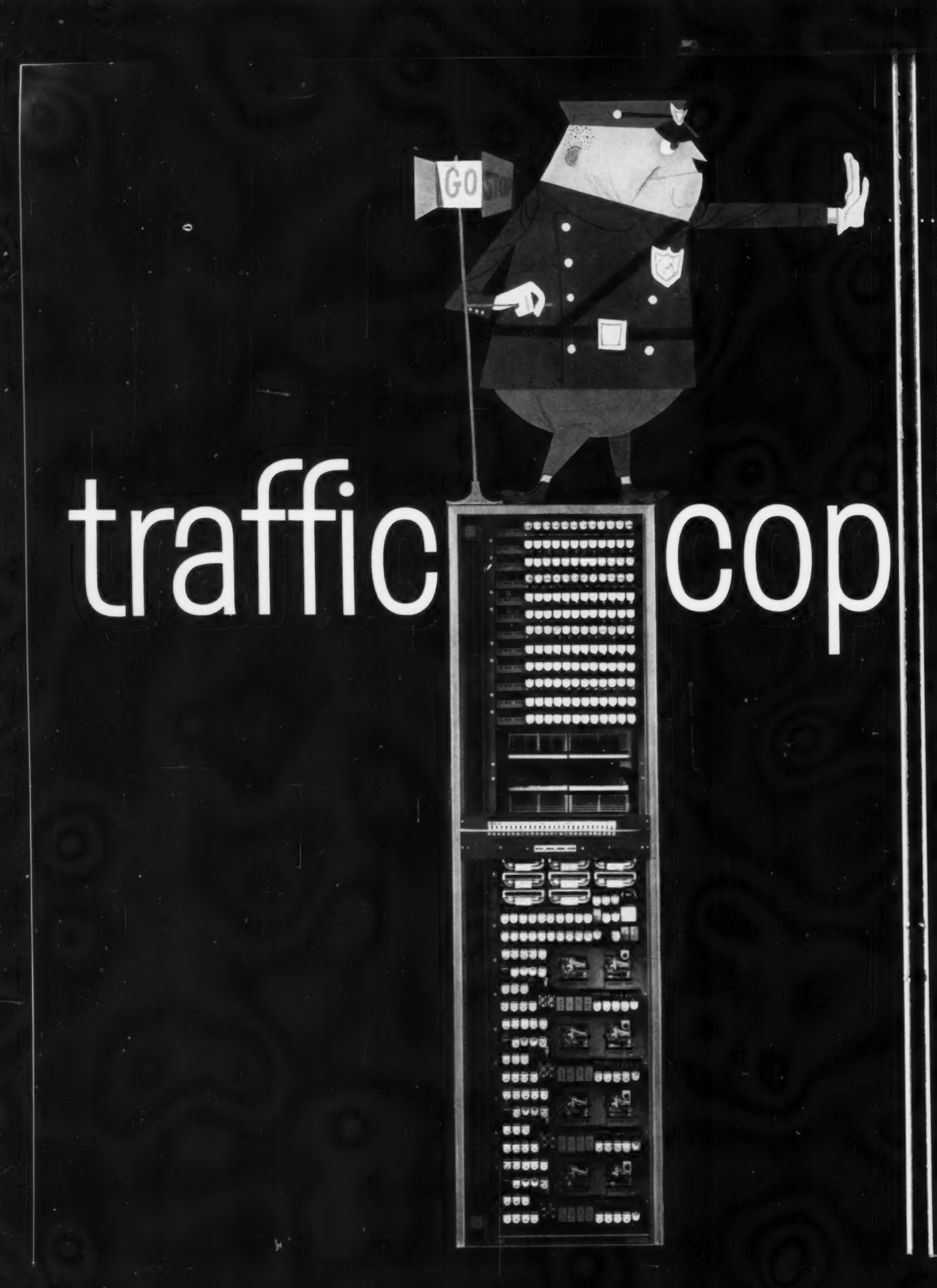
He continued:

"Another helpful comparison is indicated through computation of the operating ratio, (a further) index to the efficiency of the company's operations. . . .

"The income statement provides information for other comparisons (such

(Please turn to page 97)

Shown at the manufacturers' exhibits of the Virginia Independent Telephone Association are David K. McNish of Stromberg Carlson, Charlottesville; John deK. Bowen of Acme Visible Records, Inc., Crozet; and Kelley McNish of Inter - Mountain Telephone Co., Bristol, Tenn.


GO
STOP
traffic
cop

...THE ONLY TRUNK RESTRICTOR AVAILABLE

TO THE TELEPHONE INDUSTRY

to prevent unauthorized toll calls from

PABX's in DDD or Metered Zone Service areas

for toll calls

North Trunk Restrictor, proved in use in scores of installations, is another service "plus" to strengthen your customer relations with your largest subscribers.

PABX users will appreciate the efficiency with which the North Trunk Restrictor will "police" their toll call placement by restricting access to DDD trunks or Metered Zone Service trunks to authorized stations.

Write Dept. TR, North Electric Company, Galion, Ohio, for full detailed information on the North Trunk Restrictor—another example of outstanding "service" equipment from . . .

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

Has your toll timing system kept pace with these CALCULAGRAPH IMPROVEMENTS?

NEW COLOR-CODED HANDLES

This "visual aid" to better accuracy is a big help to busy operators—excellent for trainees, too. These new handles in color—green for start, red for finish, can be installed in minutes.

NEW SETBACK HANDLE

Now you can use ANY SIZE toll ticket—in operated position handle cannot damage toll ticket. This new feature permits Calculagraph to be used with any card system.

NEW 60-MINUTE DIAL

Busy operators can now handle more calls more efficiently because there's no need to depend on memory or manual computations on long conversations. Assures you, too, of all charges due on every call.

Check your own switchboard now. If you don't have all these Calculagraph improvements, it's time to modernize and incorporate these benefits into your toll timing system.

Your busy operators will like these easier-to-use color-coded handles; the 60-minute dial will eliminate possible human errors in recording long conversations, saving you "lost-time" dollars; and, you will like the flexibility in card sizes permitted by the set back handle. They all add up to faster, easier, more accurate toll time recording.

Call your Calculagraph distributor today. He'll be glad to discuss your modernization plans with you.

FOR LONG-TIME CALCULAGRAPH USERS ONLY

If you are now using the old "round-type" Calculagraphs, you can easily convert to the rectangular Model 33 (shown here) with the convenient adapter plate that requires just a few minutes to install.

CALCULAGRAPH Company

308A SUSSEX STREET • HARRISON, NEW JERSEY
TELEPHONE: HUMBOLDT 2-0213

MANUFACTURERS OF ELAPSED TIME RECORDERS FOR OVER 65 YEARS

Extruded, high-molecular-weight, moisture- and weather-resistant polyethylene jacket.
Corrugated coated steel tape applied longitudinally with overlap seam continuously soldered.
Corrugated aluminum shield applied longitudinally over cable core.
Paper insulated copper conductors.

GENERAL CABLE

stalpeth

CABLE

LIGHT?
STRONG?
CORROSION RESISTANT?
YES!

LIGHT weight means:

- longer spans for pole-line economy
- possible reduction in sizes of messengers, guys, anchors, etc.
- longer pulling lengths for duct runs allowing manhole pull-through and fewer splices

STRONG steel and polyethylene over the aluminum shielded core provides an impervious outer covering with rugged mechanical qualities equal to tough installation conditions.

CORROSION RESISTANT inert polyethylene offers an answer to corrosion problems frequently encountered in duct installations.

And STALPETH can be used with:

- standard commercially available splice cases
- lead sleeves for wiped joints due to solderability of the steel component

Available in a wide range of core types—Paired—Quadded—Combinations of pairs and quads—Composite—Video pairs—Low capacitance

Distributed by:

AUTOMATIC ELECTRIC SALES CORPORATION
Northlake, Illinois

LEICH SALES CORPORATION
427 W. Randolph Street, Chicago 6, Illinois

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y.
Offices and Distributing Centers Coast-to-Coast

***for quality and service...specify* GENERAL CABLE**

Highways, Education Analyzed At North Carolina Convention

By HAROLD N. SIMPSON*

THE STATUS of North Carolina's schools and highways was analyzed for the benefit of the 340 telephone people, attending the convention of the North Carolina Independent Telephone Association, held on Oct. 6 and 7 in Pinehurst.

The state and federal road programs and the present-day highway needs of North Carolina were described by J. Melville Broughton, chairman of the North Carolina Highway Commission, who spoke on "The North Carolina Highway Construction and Development Program."

He outlined the new federal interstate highway system and detailed some of the costs of modern road construction.

*Mr. Simpson is supervisor of information and advertising for Carolina Telephone & Telegraph Co., Tarboro.

The problems facing state schools and colleges were brought to the attention of North Carolina companies by Dr. D. Hiden Ramsey, chairman of the North Carolina Board of Higher Education, whose topic was "Education in North Carolina."

Dr. Ramsey told the group that the education of the more than one million school children in the state requires $4.00 out of every $5.00 of the state's general fund revenue.

He noted that North Carolina's colleges now have an enrollment of 50,000 with this figure likely to reach 100,000 in the not-too-distant future.

Other speakers at the convention included J. G. Bradbury, executive vice president of Southern Bell Telephone & Telegraph Co., who discussed "Development in the Southeast and North Carolina," and Walter W. Harper, industrial development administrator, North Carolina Department of Conservation and Development, who described "Industrial Development in North Carolina."

Guests of the association included H. T. Westcott, chairman of the North Carolina Utilities Commission, Stanley Winborne, former chairman of the commission, and William Saunders, state conservation and development board director.

Directors elected by the convention are: Walter G. Robertson of Southern Pines, P. J. Long of Tarboro, W. C. Harris of Lexington, L. D. Garibaldi of Matthews, Herbert Hussey of Durham, Tom H. Sawyer of Weaverville, Mrs. John D. Morris of Roxboro, J. F. Havens of Tarboro, W. S. Beddingfield of Mt. Airy, Hylton Wright of Mt. Airy, Robbins Tilden of High Point, J. H. Snider of Denton, H. Dail Holderness of Tarboro, J. Louis Runkle of Hickory, L. S. Blades, Jr. of Elizabeth City, E. O. Freeman of Aberdeen and L. O. Coltrane, Jr. of Concord.

Officers named by the association are: President, Mr. Beddingfield; vice president, Mrs. Morris; vice president, Mr. Long; vice president, Royster Tucker of High Point, and secretary-treasurer, Mr. Wright.

Costly Carelessness

Work accidents cost the nation nearly 4 billion dollars a year, the National Safety Council reports.

Shown are the officers and directors of the North Carolina Independent Telephone Association. They are, left to right, Walter Robertson of Southern Pines; P. J. Long of Tarboro, vice president; W. C. Harris of Lexington; L. D. Garibaldi of Matthews; Herbert Hussey of Durham; Tom H. Sawyer of Weaverville; Mrs. John D. Morris of Roxboro, vice president; J. F. Havens of Tarboro; W. S. Beddingfield of Mt. Airy, president; Hylton Wright of Mt. Airy, secretary-treasurer; Robbins Tilden of High Point; J. H. Snider of Denton; H. Dail Holderness of Tarboro; J. Louis Runkle of Hickory; L. S. Blades, Jr. of Elizabeth City; and E. O. Freeman of Aberdeen. Not shown are L. O. Coltrane Jr., of Concord and Royster Tucker of High Point, vice president.

In Times of Change... depend on ANSONIA® Ankoseal® RURAL CABLES

to meet every changing requirement

Ansonia's leadership in quality and service meets the challenge of America's progressive telephone industry.

Ankoseal Rural Cables now being shipped have been modified as follows:

RURAL DISTRIBUTION WIRE

All Ankoseal Rural Distribution Wire, including the popular 3-6-11 and 16 pair sizes, conform with new REA color coding.

PARALLEL LINE WIRE

Ankoseal Parallel Line Wire is manufactured as specified by the REA.

For complete information on the finest rural cables made, contact your authorized Telephone Supply Distributor or write direct to Ashton 1, R. I.

THE ANSONIA WIRE & CABLE COMPANY

111 MARTIN STREET, ASHTON 1, RHODE ISLAND

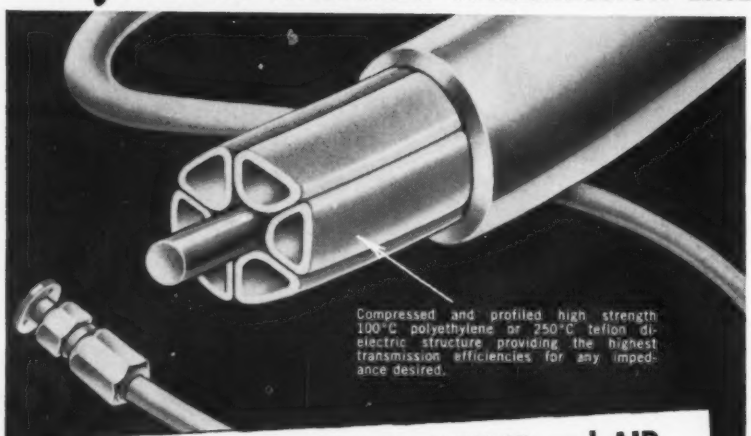
"Leadership in Plastic Cables Through Quality and Service"

600-8

NEW All-American!

Spir-O-line®

SEMI-FLEXIBLE ALUMINUM TRANSMISSION LINE

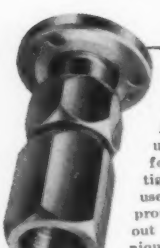

Compressed and profiled high strength 100°C polyethylene or 250°C teflon dielectric structure providing the highest transmission efficiencies for any impedance desired.

UNIQUE! ADVANTAGES of SOLID and AIR DIELECTRIC LINE COMBINED by Prodelin in revolutionary All-Aluminum Cable and Connector

*Spir-O-line** — Prodelin's latest contribution to air-dielectric transmission — combines the low loss of air dielectric with the high power of solid dielectric lines by using dielectric tubes compressed and profiled into a symmetrical supporting structure. *Spir-O-line* is available in continuous lengths up to 1000' with reliably low VSWR and 50, 70, 75 ohm, and other impedances; the 50 ohm line usable up to these cut-off frequencies: ⅜" - 15.0 Kmc; ½" - 10.0 Kmc; ⅞" - 5.0 Kmc; 1⅝" - 2.8 Kmc; 3⅛" - 1.5 Kmc. The normally non-corroding aluminum-alloy outer conductor is available with a non-contaminating polyethylene jacket for caustic environments.

FEATURES

- No special techniques or tools required to make up cable-connector assembly
- No metallic welds or dielectric splices are used regardless of cable length
- Continuous high-conductivity aluminum sheath assures maximum pressure tightness and weather protection
- Uniform straight lay tubular support throughout keeps inner conductor smoothly centered on bends
- Pressure-tight and high tensile cable-connector assembly can be made with only hand-tightening
- Dielectric structure makes continuous and intimate line contact with both conductors without spiraling — yielding best broadband performance, highest power handling capacity, lowest attenuations, and VSWR smoothness
- Both cable and connector available for −90°C to +250°C operation
- Terminates in standard EIA (RETMA) dimensions



PLUS

Spir-O-line Connector

Amazing Prodelin development! Adequately pressure-tight for lab use when hand-tightened . . . ready for field service when wrench-tightened. Specifically designed for use with soft aluminum tubing to provide highest tensile strengths without tube distortion. No special techniques, bulky fixtures, or non-standard tools required. *May be used again and again without redressing tubing or replacing connector parts!* Saves time and money! RETMA dimensioned.

Specify Spir-O-line HI-TEMP with Teflon for 250°C operation

ANTENNAS and TRANSMISSION LINES
Prodelin Inc
KEARNY, NEW JERSEY, U.S.A.

Reconsider your cable requirements now and ask how Spir-O-line can provide new life with added economies in your service! WRITE FOR TECHNICAL BULLETIN TODAY

DEPT. T-5, 307 BERGEN AVE., KEARNY, N. J.

*PATENTS PENDING

Spir-O-line! — the only All-American Semi-Flex Aluminum Cable and Connector Conceived, Engineered, and Manufactured in the U. S.!

W. A. Flory Becomes Manager of New York Independent

Willis A. Flory of New Holland, Pa., recently became manager of the Walden (N.Y.) Telephone Co.

Mr. Flory was retained to fill a vacancy on the executive staff caused by the resignation of Marcy L. Sperry, executive vice president and director of the company.

The announcement was made by Wayne L. Lowe, who in October succeeded his brother, Richard, as president of the company.

For 11 years, Mr. Flory was district manager of the Commonwealth Telephone Co., Easton, Pa., and also served as assistant to the manager of the Enterprise Telephone Co., New Holland, Pa., and as commercial engineer with the Southeastern Telephone Co. at Ft. Walton Beach, Fla.

He was born in Pennsylvania and attended school there, including Lafayette College at Easton, Pa.

Book Review

"TOPICS IN ELECTROMAGNETIC THEORY," **by Dean A. Watkins; 118 pages; $6.50**

Recent information in the field of electromagnetic theory and microwave electron tubes is brought together in this new book written by a professor of electrical engineering at Stanford University who is also president of the Watkins-Johnson Co. of Palo Alto, Cal.

In preparing his work, Dr. Watkins has selected important material that until now has appeared only in scattered journal articles. The first of four chapters deals with periodic transmission systems. Both the field approach and the equivalent circuit approach are employed to clarify this topic.

In the second chapter, the author discusses propagation on a wire helix, pointing out that the helix is a most unusual transmission system as well as a basic geometric form.

The third chapter goes into concepts concerning coupling of modes of propagation.

In the final chapter, Dr. Watkins provides a view of the world of anisotropic media and the waves that propagate therein. The book can be purchased from TELEPHONY.

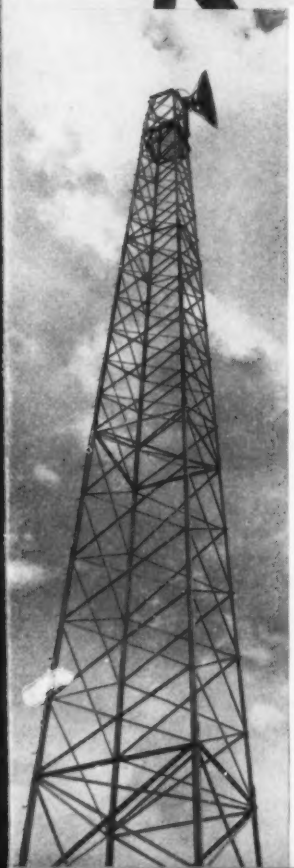
Incorporates in Nebraska

The Panhandle Telephone Co., Inc., Dix, filed articles of incorporation with the Nebraska Secretary of State, it was reported on Nov. 26. Incorporators are Russell and Mildred E. Brothers of Dix.

Pound of Prevention

"He who does not prevent a crime when he can, encourages it."—SENECA.

Five tower system features 100 foot towers at Jasper (top) and White Springs (left) . . . and a 225 foot structure at company headquarters at Live Oak (right). This tower was especially reinforced at the top to support two mobile antennas which extend all-over height to 270 feet. The other towers located at Branford and Mayo are 170 feet and 150 feet respectively.



On these Blaw-Knox towers North Florida Telephone builds its big microwave future

Fast growing Florida looks toward a bright future. And forward looking telephone companies keep pace with easily expandable microwave systems. North Florida Telephone Company, for instance, had 3,675 phones in '53, plans to have 9,000 phones in service by the end of '58. They found for low cost maintenance and economical expansion nothing does it like microwave.

And they found Blaw-Knox Microwave Towers best suited to their dynamic growth. Backed by over 40 years of tower experience, Blaw-Knox designs to individual area requirements, engineers to established specifications and builds for future adaptability.

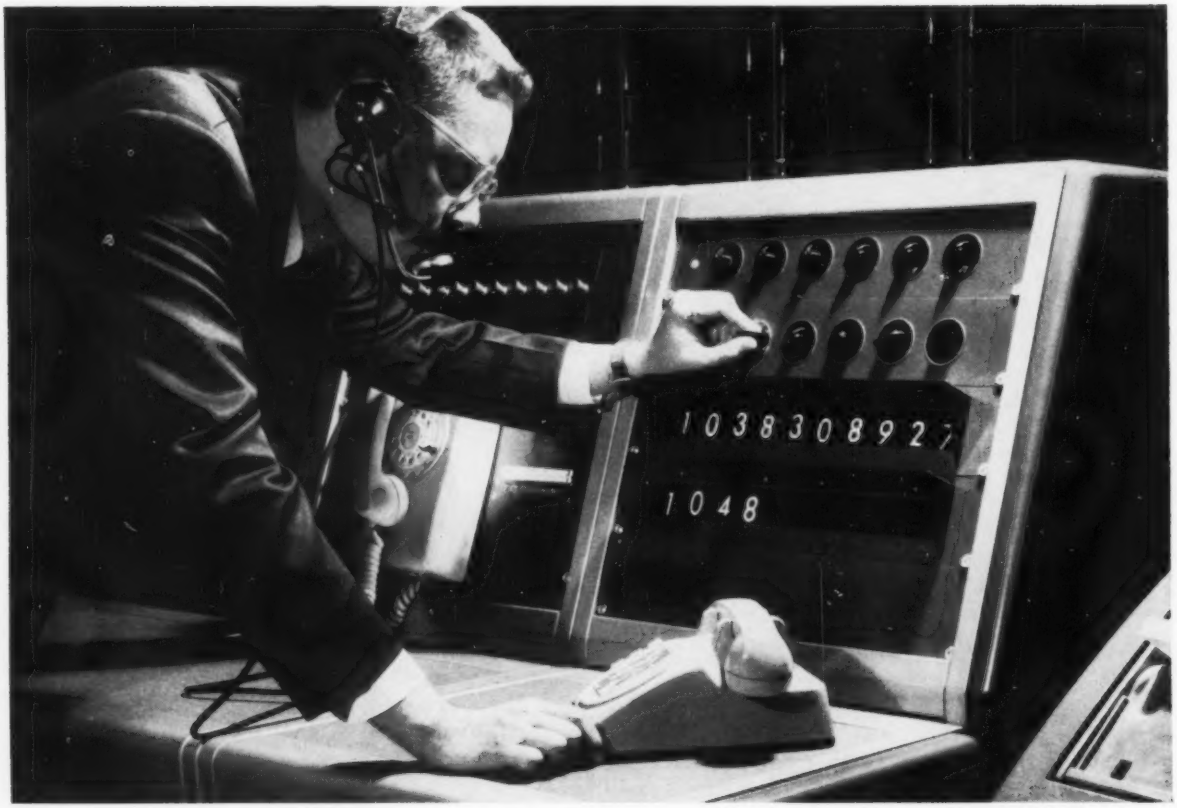
Blaw-Knox's complete tower service includes adapting towers to sites, modern fabrication and experienced erection assistance. For details, write for Microwave Tower Booklet 2538.

Microwave Towers — guyed and self-supporting towers for microwave, AM, FM, TV, radar and communications . . . transmission towers . . . parabolic antennas . . . special structures.

BLAW-KNOX

BLAW-KNOX COMPANY
Equipment Division
Pittsburgh 38, Pennsylvania

MECHANIZED ORACLE EXPLORES BELL SYSTEM COMMUNICATIONS



At monitoring console, designer H. D. Irvin watches performance of "Sibyl" during test of user-reaction to experimental telephones. A computer-like machine, Sibyl simulates the functions of future communications devices and records interplay between phones and users. Sibyl is named after the women oracles of ancient Greece.

A mechanized "oracle" is helping Bell Telephone Laboratories predict the future in communications devices and systems.

The oracle is "Sibyl," a computer-like machine developed by Bell Laboratories engineers and psychologists. It can simulate the action of many kinds of communications devices. Through Sibyl, new kinds of telephone service can be evaluated without the considerable expense of building actual equipment. Observing and recording users' reactions to the simulated equipment, Sibyl provides indications of how users would react to proposed new systems features and equipment.

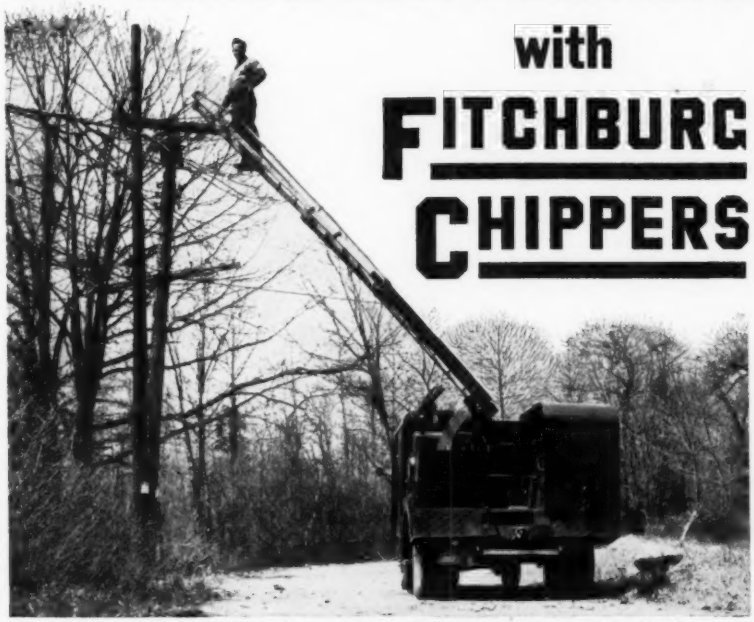
Sibyl, for example, is used to test the reaction of Bell Laboratories people to experimental push-button telephones. Each test subject has a push-button telephone in his office and he uses it in the ordinary course of his business. But the set is not connected directly to the local PBX: it is connected *through* Sibyl, which performs the special signaling functions required by such a push-button telephone. In this way, push-button telephone service is given to a group of people without modifying the PBX, or providing completely instrumented push-button telephones.

At the same time, Sibyl gathers information on how the call was placed—date, time, originator, speed of operation, errors, whether the line was busy or the call completed. Sibyl does all this without violating the privacy of telephone conversations.

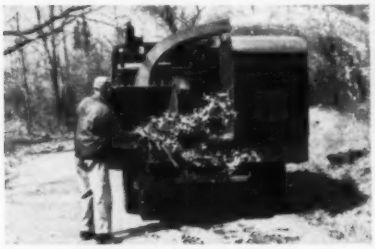
Bell engineers expect that Sibyl will provide a better understanding of the relationship between telephone equipment and the people who use it. Sibyl's rapid and economical technique for evaluating new types of telephone sets is an important contribution to the art of telephony.

BELL TELEPHONE LABORATORIES
WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

Telephone and Power Companies
CUT BRUSH DISPOSAL COSTS 25 TO 50%
with FITCHBURG CHIPPERS



Crewmen from Rockland Light and Power Company, now Orange & Rockland Utilities, Nyack, N. Y. use special aerial ladders for pruning topmost branches.



BRUSH DISPOSAL METHOD No. 1
Rockland Light and Power Company crewman blows chips from FITCHBURG CHIPPER along roadway.

BRUSH DISPOSAL METHOD No. 2
Rockland Light and Power Company crewman blows chips from FITCHBURG CHIPPER into truck bin.

Some of the many Telephone and Power Companies using Fitchburg Chippers

Arizona Public Service
Phoenix, Arizona
Atlantic City Electric Company
Atlantic City, New Jersey
Central Hudson Gas and Electric Co.
Newburgh, New York
Consumers Power Co.
Jackson, Michigan
McDaniel Telephone Company
Salkum, Washington
Millington Telephone Co.
Millington, Tennessee
Mt. Vernon Telephone Corp.
Mt. Vernon, Ohio
Missouri Power & Light Co.
Hermann, Missouri
New Jersey Bell Telephone Co.
Vineland, New Jersey
Ohio Central Telephone Corp.
Patuskala, Ohio
Pacific Telephone and Telegraph
Northwest Area
Portland General Electric
Portland, Oregon
Public Service Co. of Oklahoma
Lawton, Oklahoma
Shawnigan Water and Power Co.
Quebec, Canada
Somerset Telephone Co.
North Anson, Maine
Southern California Edison Co.
Los Angeles, California
Valley Telephone Company
Silverton, Oregon
West Jersey Telephone Co.
Belvidere, New Jersey

A FITCHBURG CHIPPER will help get your brush disposal job done with *fewer men at less cost*—in any weather, wet or dry. No more loading, hauling, dumping, burning. Chips may be automatically loaded on truck or blown along right-of-way to keep down weeds.

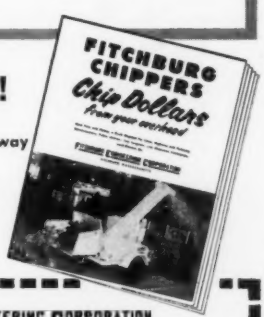
SAFETY IN OPERATION: Exclusive Fitchburg spring-activated feed plate automatically adjusts as wood of different sizes is fed into the machine. This feature allows you to chip larger size wood without extra power. It reduces shock action, protects the operator in case foreign materials are accidentally fed during operation.

MINIMUM MAINTENANCE: No heavy fly wheel to cause clutch strain or bearing failure. Easily maintained by your own field personnel.

ONE YEAR GUARANTEE: Only Fitchburg Chippers give you *all* these features, backed by the experience and engineering skill of the world's pioneer manufacturer of wood chipping equipment. For a facsimile of the exclusive Fitchburg guarantee and color brochure described at right, mail the coupon today.

NEW! FREE!

Mail Coupon for Brochure. Shows cut-away drawings of Fitchburg Chippers in action, specifications, photographs.



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Send Free Copy of "Chip Dollars from Your Overhead."

Name .....
Position .....
Company .....
City or Town ..... State .....

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WHITNEY BLAKE

Telecable®

INSIDE WIRING CABLE

Available in Brown or Ivory Jacket in 22 and 24 A.W.G. from 6 to 76 pairs. WB Inside Wiring TELECABLE offers many advantages including:

- Light weight for easy installation
- Moisture resistance for damp ducts
- Plastite insulation resists crushing
- Easily pulled when installing in ducts
- Unaffected by humidity
- Easy to terminate
- Full color-coded insulation assures lasting polarity identification
- Jacket is tough, flame and abrasion resistant
- Steel rip wire makes stripping easy
- Permanently marked with gage and number of pairs

INDEPENDENT

WB

5-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

COURTS and COMMISSIONS

Tenn. High Court to Rehear Relocation Repayment Case

The Tennessee Supreme Court on Dec. 1 was to have begun rehearing the lawsuit involving the removal of utilities from highway rights-of-way (TELEPHONY, Sept. 20).

The court had declared unconstitutional an act which would require the state to pay for removal of utilities from rights-of-ways for the super, interstate highways, and, in hardship cases.

The utilities would pay for the removal of their facilities from other highways except in the hardship cases.

The act was passed by the 1957 legislature, but was called unconstitutional in court by W. M. Leech, state highway commissioner. He had filed suit against Southern Bell Telephone & Telegraph Co. to test the law.

The supreme court agreed to rehear the case after a petition asking this was filed by Southern Bell, which has argued the law is valid.

NW Bell Appeals Circuit Court Rate Decision in S. D.

Northwestern Bell Telephone Co. on Nov. 21 filed notice it was appealing a decision by Circuit Judge O. K. Whitney of Pierre who upheld the South Dakota Public Utilities Commission's refusal to grant the company a requested half-million-dollar rate increase (TELEPHONY, Aug. 16).

The company had asked the circuit court to grant a rate of return on its investment equivalent to one approved earlier by the commission. The company also held that the commission did not properly take into account that huge plant-improvements had been made at Aberdeen.

Judge Whitney said there was no justification for the company's demand for the same rate of return that had been approved earlier. The company had failed in its presentation to his court, he added, to show that the commission acted incorrectly.

The court labeled Northwestern Bell's action as premature, in view of the fact that it had been granted an increase totaling $503,000 just four months earlier.

Declaring there should be a reasonable trial period under present rates before considering the company's new

New
Universal COLOR CODING
for all MULTIPAIR
DISTRIBUTION WIRES
AND TELEPHONE CABLES
as listed by REA

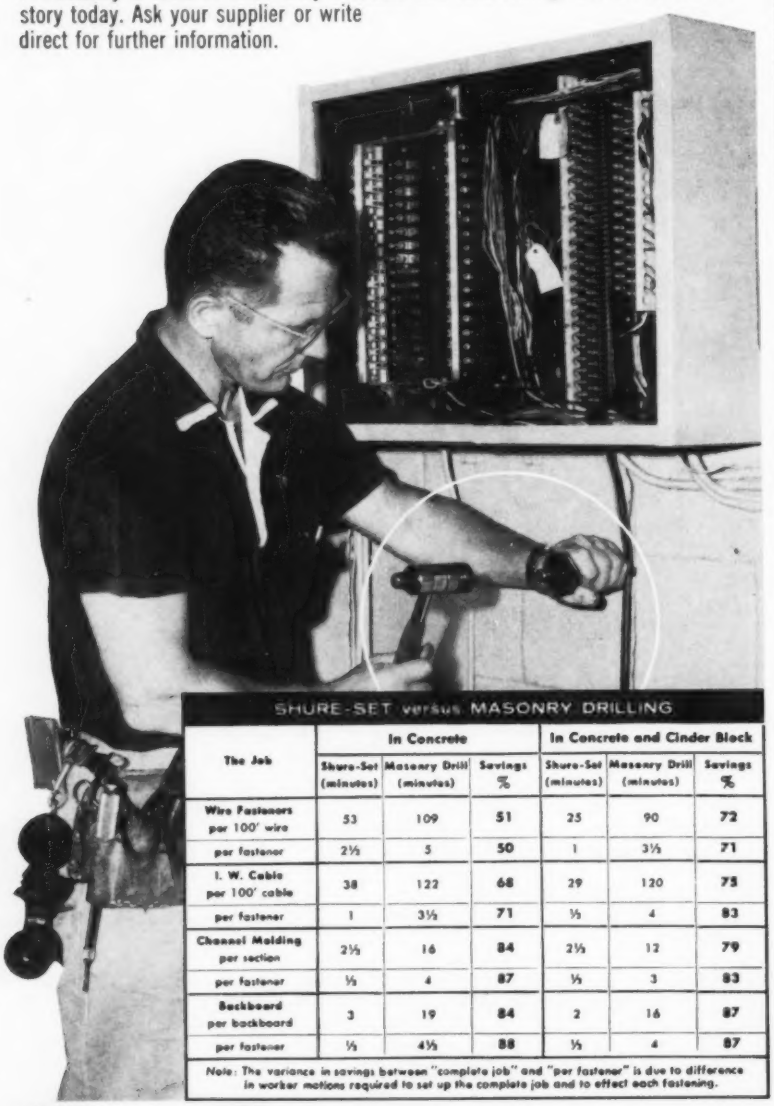
For complete information on new color codings, write for Bulletin R1058.

THE REX CORPORATION 100 Hayward Road, West Acton, Mass.

Field-proven *Shure-Set* cuts fastening time 50 to 80%

Telephone companies everywhere are enjoying tremendous time-savings with the Shure-Set R-260 fastening tool. This unique "hammer-in" method provides cleaner, faster, surer fastening while boosting efficiency and reducing worker fatigue. The table below shows "on-the-job" savings from just one of the many telephone companies now using Shure-Set.

The R-260, which requires no cartridge, is ideal for direct setting of threaded studs, pins, and wire loops. An adaptor turns it into a holder for your masonry drill . . . actually 2 tools in one—truly versatile and time-saving! Get the Shure-Set story today. Ask your supplier or write direct for further information.



SHURE-SET versus MASONRY DRILLING

The Job	In Concrete			In Concrete and Cinder Block		
	Shure-Set (minutes)	Masonry Drill (minutes)	Savings %	Shure-Set (minutes)	Masonry Drill (minutes)	Savings %
Wire Fasteners per 100' wire	53	109	51	25	90	72
per fastener	2½	5	50	1	3½	71
I. W. Cable per 100' cable	38	122	68	29	120	75
per fastener	1	3½	71	½	4	83
Channel Molding per section	2½	16	84	2½	12	79
per fastener	½	4	87	½	3	83
Backboard per backboard	3	19	84	2	16	87
per fastener	½	4½	88	½	4	87

Note: The variance in savings between "complete job" and "per fastener" is due to difference in worker motions required to set up the complete job and to effect each fastening.

***Shure-Set*® HAMMER-IN FASTENING TOOLS**

***Ramset*® Fastening System**

WINCHESTER-WESTERN DIVISION · OLIN MATHIESON CHEMICAL CORP.

12145-L BEREA ROAD CLEVELAND 11, OHIO

request, Judge Whitney said that "based on past experiences, another adjustment will be made in the not-too-distant future and a trial period would provide evidence for consideration by both parties."

Seek Raise, Bond Approvals; Get Note, Sale OKs in Ind.

The following petitions were filed with the Indiana Public Service Commission recently:

The Farmer's Mutual Telephone Co., East Enterprise, on Nov. 12 asked permission to raise rates.

The United Telephone Co. of Indiana, Inc., Warsaw, on Nov. 13, asked to issue one million dollars worth of first mortgage bonds and 14,000 shares of its $50 par value common stock.

The commission also approved the following petitions:

The Nappanee Telephone Co. was authorized on Nov. 7 to sell $177,000 in first mortgage notes at an interest rate not to exceed 5 per cent to the Lincoln National Life Insurance Co.

The Northwestern Indiana Telephone Co., Hebron, was authorized on Nov. 7 to purchase the Mt. Ayr Telephone Co. (TELEPHONY, Aug. 2). The Northwestern company was also allowed to borrow $85,000 from Stromberg-Carlson Co. and to increase rates at the Mt. Ayr exchange effective on conversion to automatic operation.

General Telephone Co. of Indiana was authorized to borrow 6.8 million dollars from the Bankers Trust Co.

Carolina T&T Registers Common Stock with SEC

Carolina Telephone & Telegraph Co. filed a registration statement with the Securities & Exchange Commission on Nov. 17 covering the proposed sale of 58,773 shares of common capital stock.

Under the proposal the company would issue rights, in accordance with the prospectus, to existing stockholders in the ratio of one additional share for each five shares held. The subscription price of the proposed issue is $125 per share.

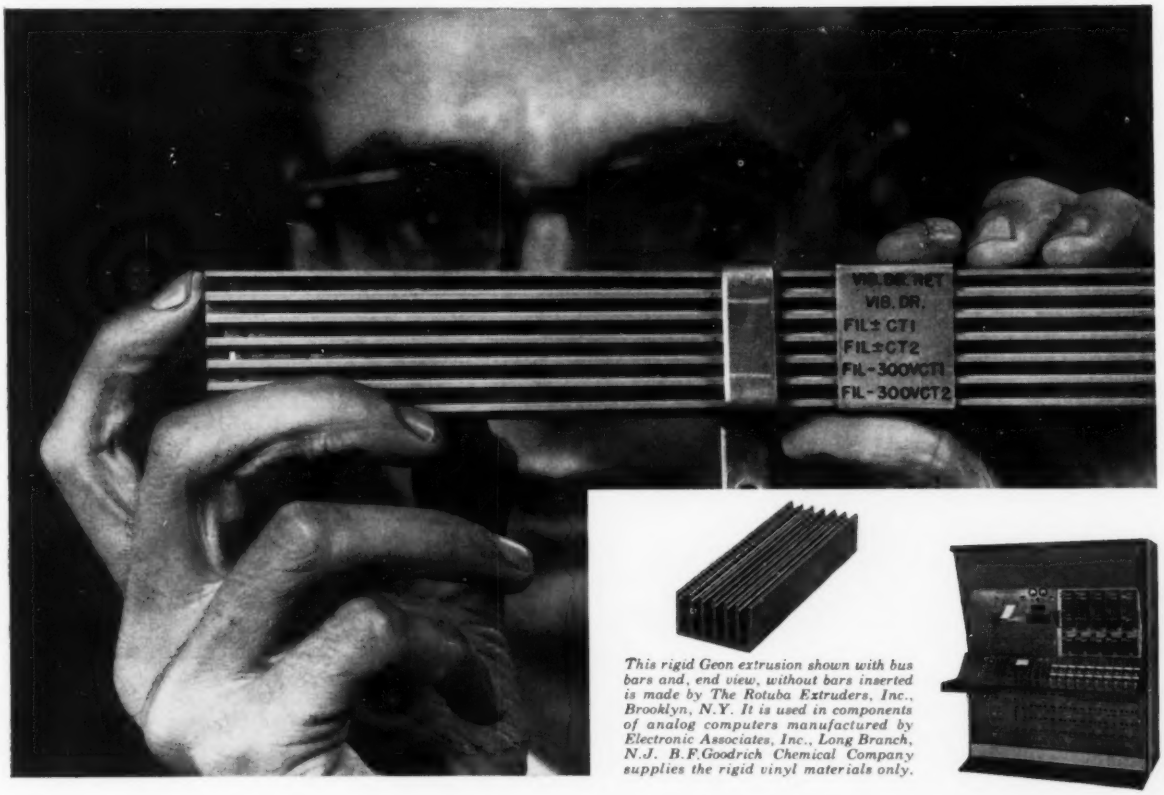
The registration statement was filed with the SEC pursuant to authority by the company's board of directors and an order from the North Carolina Utilities Commission authorizing the issuance and sale of the additional common capital stock at the price of $125 per share.

Southern Bell Telephone & Telegraph Co., owner of 65,952 Carolina T&T common shares, or 22.6 per cent, announced

(Please turn to page 64)

Another new development using

B.F.Goodrich Chemical *raw materials*



This rigid Geon extrusion shown with bus bars and, end view, without bars inserted is made by The Rotuba Extruders, Inc., Brooklyn, N.Y. It is used in components of analog computers manufactured by Electronic Associates, Inc., Long Branch, N.J. B.F.Goodrich Chemical Company supplies the rigid vinyl materials only.

Extrusion of rigid Geon

. . . cuts bus bar insulation costs, saves assembly time

This extrusion of Geon rigid vinyl material saves cost, time and space for electrical assemblies. It is used to retain and insulate six strip-type bus bars of varying voltages up to 600 volts DC. They can be placed closer together because of rigid Geon's high dielectric strength and high insulation value.

Rigid Geon brings material costs down, too, for this application. It also shortens assembly time and saves weight and space.

In addition, the use of extrusions made from Geon rigid vinyl material provides good chemical and abrasion resistance. If desired, they can be colored for coding purposes. It's another example of the way Geon rigid vinyl can be the key to a new or improved product or application. For information, write Dept. LT-6, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon
Polyvinyl Materials

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

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Are you planning to buy dial equipment for your exchange? If you specify *Strowger Automatic*, you can approach any lending agent with the positive assurance that you have chosen the most well-known, dependable and proved-in-service switching equipment available.

ASK YOUR A.E. REPRESENTATIVE for complete details. He'll be glad to show you why Strowger has earned its reputation for quality and dependability. Write Automatic Electric Sales Corporation, Northlake, Illinois. Or, call Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

another reason why
Men Choose Strowger!

it will sell all of its rights at competitive bidding.

The proceeds from the proposed issue of common capital stock will be used to reduce outstanding bank loans of more than 8 million dollars which the company has made in carrying out its expansion and improvement program.

To Review Tex. Relocation Law in Appellate Court

The Third Texas Court of Civil Appeals on Nov. 26 was to have reviewed a decision by District Judge J. Harris Gardner, who upheld the constitutionality of a state law providing that funds of the state-federal interstate highway program can be spent for relocating utility facilities as well as for purchase of rights-of-way and for highway construction (TELEPHONY, Aug. 30).

Judge Gardner had granted motions for summary judgement upholding the law filed by Southwestern Bell Telephone Co., two gas companies, and the cities of Dallas and Austin.

If Judge Gardner's decision is upheld, cities, as well as utilities, will be spared the expense of relocating lines and other facilities along the 2,905 miles of major highways being improved in Texas. Cost of such relocation has been estimated as high as 100 million dollars.

The attorney general's department, in bringing the suit, has attacked the constitutionality of the reimbursement law.

Authorize Rate Raise For New York Independent

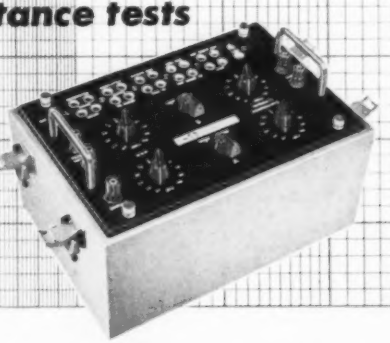
The New York Public Service Commission has accepted a tariff amendment filed by Clymer Telephone Company, Inc., designed to produce about $3,500 in additional annual revenue.

The company serves about 600 stations in and near Clymer. As a result of its conversion to automatic operation in September, the rate base on which it is entitled to earn a return has increased by more than $30,000.

Ask Financing OK in N. Y.

The New York Public Service Commission on Dec. 5 was to have heard the petition of the Chautauqua & Erie Telephone Corp., Westfield, for permission to amend its certificate of incorporation to issue 20,000 shares of preferred stock and for authority to issue $150,000 of $50 par value 5 per cent preferred stock and $400,000 of 5¼ per cent 25-year first mortgage bonds.

Speed up acceptance tests with Airtronics PORTABLE Test Hybrid Set



The Airtronics Portable Test Hybrid eliminates troublesome make-shifts. Adjustments are made with simple switch and knob settings for all acceptance tests on toll and inter-office trunks.

The 600 ohm or 900 ohm hybrid structure has high internal balance, impedance matching coil, impedance compensator and capacity decades. The controls simplify trunk completion tests, return loss or singing point measurement, or impedance compensator adjustment. Network build-out values easily determined by test. Rugged construction throughout. Write today for full details.

Another Airtronics Product for the Telephone Industry:
Packaged Program Equalizer embodying all possible arrangements for use on 5, 8 or 15 KC channels.

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Order Tex. Druggist to Stop Advertising Free Service

The Harris County (Tex.) District court has ordered a Houston druggist to desist from advertising free telephone service, it was reported on Nov. 10.

In the case of Phillip Eilar v. Southwestern Bell Telephone Co., District Court of Harris County, Tex., Mr. Eilar sought an injunction to prevent the discontinuance of his telephone service by the company. The company charged that the free service Mr. Eilar offered his customers was in violation of company tariffs, which provide that subscriber telephone service is furnished only for the use of the customer, his family, employes, or business associates.

Mr. Eilar, who had advertised this service on signs which line the thoroughfare near his store, agreed to discontinue the advertising of the words "Free Telephone," "Telephone," "Public Telephone and any other advertising which held out to the public that telephone service was available to the public in his place of business.

Pennsylvania Company Asks Rate, Paystation Raises

The Clearfield & Cambria Telephone Co., Coalport, has filed an application with the Pennsylvania Public Utility Commission asking for rate increases amounting to $13,500 annually. The company serves 740 subscribers.

Present and proposed rates are as follows:

	Present	*Proposed*
One-party residence	$2.75	$5.00
Two-party residence	2.25	3.50
Four-party residence	2.00	3.00
Multi-party residence	1.75	3.00
One-party business	3.25	7.00
Two-party business	3.00	5.50
Four-party business	2.50	4.50
Multi-party business	2.25	4.50

The company is also asking permission to raise paystation rates from five to 10 cents.

The company said the additional revenue is necessary to give it a fair return on its original cost. It also cited a need to service funded debt created by an improvement program and to "fulfull its service obligation."

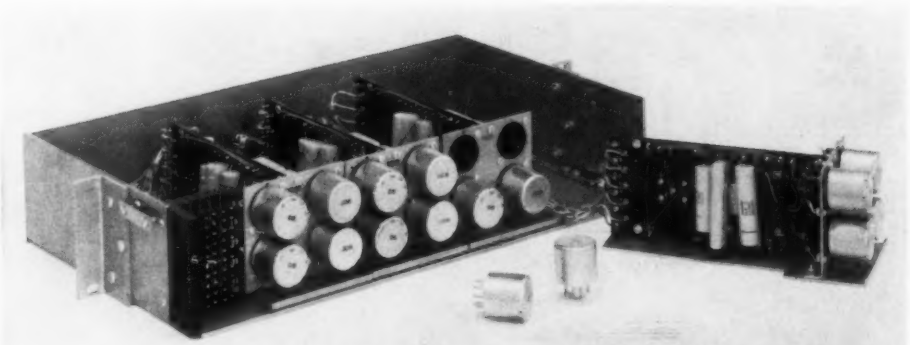
Approve 2.93% Return for Oregon REA Borrower

Dial service rates for Blue Mountain Telephone, Inc., Spray, were authorized on Nov. 24 by the Oregon Public Utility Commissioner.

Net operating income of $16,443.04 is forecast, which, on a rate base of $560,383.65 (average net plant and

(Please turn to page 67)

Now Miniaturized! Kellogg K-840 4-Wire Terminating Equipment



Units can be extended from the shelf without interrupting service.

SAVES 75% IN SPACE! The new miniaturized K-840 four-wire terminating equipment now offers two big advantages. It meets the high balance requirements necessary for operation of high grade toll circuits, and it takes up only one-quarter of the space used by older equipment.

In addition, the new K-840 permits operation of signaling trunk circuits without affecting the balance of associated voice frequency circuits. Hence it is ideal for use in two-wire switching offices where a 27 db balance or better must be maintained.

The K-840 incorporates the most advanced design techniques, modern production methods and high-quality components to provide a nearly constant two-wire impedance across the voice frequency band. Four units in a shelf occupy only 3½" of vertical space on a 19" rack. A plug-in rotatable pad provides fine attenuation adjustments for losses in ¼ db. steps up to 1 db. A second pad is selected for coarse 1 db attenuation adjustments.

Ask your Kellogg representative to explain all the advantages of this versatile low cost equipment.

Kellogg Switchboard and Supply Company, 6650 South Cicero Ave., Chicago 38, Illinois. Communications Division of International Telephone and Telegraph Corporation.

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MAyfair 1-4418
TWX KC KAN 1055

MINNESOTA
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Minneapolis 16, Minn.
West 9-6715
TWX MP 1195

NEW JERSEY
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Passaic, New Jersey
PRescott 9-3610
TWX PAS 1067

OHIO
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Mansfield, Ohio
LAfayette 4-6511
TWX MANS 0132

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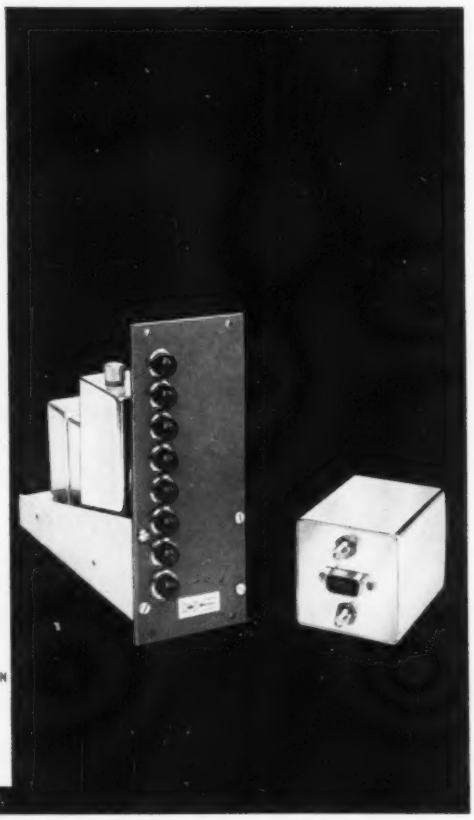
A MAJOR BREAKTHROUGH IN REMOTE INDICATION & CONTROL

The MONITRON has been called *The AUTOMATIC WIRE CHIEF* because it will continuously "scan" an unlimited number of circuits or functions in an unattended central office, CDO, PBX, Repeater Station, Radio or Microwave installation. It will report normal or abnormal conditions back to a location where personnel are on duty. The MONITRON will monitor equipment for such conditions as ● Permanent Signals ● High and Low Voltage ● Cable Failure ● Fuse Alarms ● Intruder Alarms ● Fire or Temperature Alarms ● Equipment Off Normal Alarms. The MONITRON can also be used in reverse—as a remote control. Alarms can be retired, equipment reset, or apparatus turned on or off from a distant point. The MONITRON is fully transistorized. It has no relays, switches, contacts or tubes to give trouble. Condition reports are given in standard telephone fashion on panel lights. Construction is modular; units can be replaced by non-technical personnel as easy as changing a light bulb.



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working capital), will be a 2.93 per cent return. Net operating revenues are expected to be $88,468.74.

Blue Mountain Telephone has secured authority to borrow $577,000 from REA.

Mitchell and Spray exchanges have been converted to automatic operation and the company's other two exchanges were scheduled for conversion by the end of November.

As of the hearing date, the company served 487 subscribers, with 525 total subscribers having signed to take service.

In his conclusions the commissioner stated:

"The company should be required to file a policy, acceptable to both the REA and the commissioner, which would provide for extension of service in the area to those customers where the cost did not exceed seven times the estimated annual exchange revenue to be derived from the service installed."

Southern Bell Asks to Buy 1,500-Station N. C. Company

Southern Bell Telephone & Telegraph Co. asked the North Carolina Utilities Commission on Nov. 25 for permission to purchase the Guilford Telephone Co., Guilford College, which serves about 1,500 stations and is adjacent to Southern Bell's Greensboro exchange (TELEPHONY, Nov. 1).

Stockholders of the Guilford company voted Oct. 23 to sell to Southern Bell and the latter company noted this fact in its petition to the commission, pointing out that "both the Guilford College area and Greensboro have grown in recent years to such an extent that the Guilford area has become an integral part of the Greensboro metropolitan area."

It said that after the purchase is approved, it will "launch a much-needed construction program to expand and improve telephone service in the Guilford College area."

General Announces Purchase Of Richmond, Ind., Company

General Telephone Corp. recently announced that it has acquired control of the Richmond (Ind.) Home Telephone Co. which serves nearly 20,000 subscribers. The purchase price was not disclosed.

Transfer of control of the Richmond company took place in General Telephone's New York City offices with John P. Lontz, treasurer, and Charles R. Lontz, secretary, representing the Richmond company.

New officers of the company include

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FULLY COLOR-CODED TELECABLE®
EXCHANGE AREA CABLE
Simplify your cable splicing and terminal installation by asking for the new fully color-coded Whitney Blake TELECABLE . . . it offers the same high quality that has made TELECABLE a recognized leader in the independent telephone industry. An 8 mil aluminum shield applied longitudinally replaces the 4 mil spiralled shield formerly used on all popular sizes. Manufactured in accordance with REA specification PE-22.
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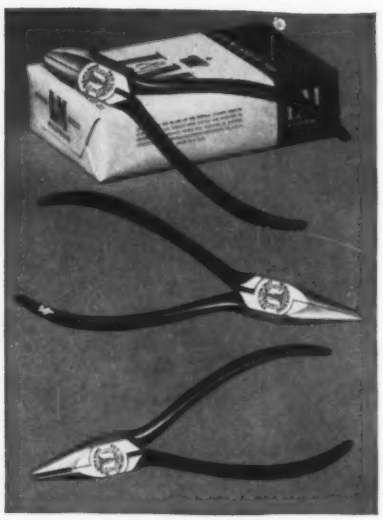
midget pliers added to KLEIN line



Hardly larger than a package of your favorite cigarettes, these new Klein Midget Pliers will simplify many of those small jobs where space is confined.

Midgets in size but giants in performance, they solve major problems when wiring up electronic assemblies; making model trains, airplanes, automobiles, or in any extremely small or confined work.

These new midgets are additions to the famous Klein line of high-quality pliers that are backed by over a century of manufacturing experience. See your dealer.

No. 257-4 Oblique Cutting Plier	**Size 4 in.**
321-4½ Long Nose Plier	**4½ in.**
322-4½ (Without Knurl)	**4½ in.**
224-4½ End Cutting Plier	**4½ in.**

Free Bulletin on Klein Pliers

Bulletin 758 lists the many various pliers in the Klein line. A copy is yours for the asking. Write for it today.

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Louis H. Meyer, president; Denver C. Harlan, vice president; Robert Mutch, secretary and treasurer, and P. E. Hoff, controller. New directors include the Messrs. Meyer and Harlan, John M. Harlan, John Lontz, Charles Lontz, Walter A. McCullour and James F. Van de Vusse.

The Messrs. Mutch, Hoff, McCullour and Van de Vusse are officers of General Telephone Co. of Indiana, Ft. Wayne.

Complete Hearing La. Bell Rate Raise Appeal

Attorneys for the Louisiana Public Service Commission on Nov. 24 contended in a Baton Rouge court that Southern Bell Telephone & Telegraph Co. went on a "sitdown strike" after the state supreme court upheld a commission ruling which reduced the company's rates in Louisiana (TELEPHONY, Nov. 8).

Arguing before District Judge G. Caldwell Herget, Theo Cangelosi, attorney for the commission, contended Southern Bell deliberately refused to deliver normal service in Louisiana and did not launch a normal program of expansion.

After hearing arguments of both sides, Judge Herget set Dec. 19 as the date on which Southern Bell attorneys must submit briefs. Commission attorneys have until Jan. 19 to submit briefs. Arguments closed on Nov. 24.

Southern Bell is seeking to have the district court upset a recent commission ruling which denied the company a rate increase until it launches an expansion and improvement program.

The company had asked for a 14-million dollar rate boost, including 7 million dollars as an interim increase.

The company, in a hearing before District Judge Herget, charged bias and prejudice by the commission.

The commission ruled Southern Bell entitled to $1,918,707 in extra revenues.

But, it added, the company had "failed to perform its obligations as a public utility" and rejected the increase until service improved and a reasonable expansion program began in Louisiana.

A Southern Bell attorney, Raburn Monroe, contended adequacy of service was not at issue in the 10-month hearings. He said the commission merely dragged "a school of prejudicial red herrings through this case."

Counsel for the Commission, Louis Claiborne, said in finding the company elegible for almost 2 million dollars in higher rates, the commission stuck close to the method approved last year by the Louisiana Supreme Court.

(Please turn to page 99)

SECODE
SELECTIVE CONTROL DEVICES

Reports On...

A Power Company's Private Radio System

Secode selective signaling has paid off handsomely for one of the country's largest power utilities.

The Problem

Every truck in their fleet is radio equipped. Each truck carries a two-man crew. Normally, crews are away from their trucks except while traveling between jobs. Until Secode selective signaling was installed, there was no simple reliable way to call crews working on jobs some distance from the truck.

Many power company trucks still carry an extra man simply to attend the radio . . . an unnecessary expense for fleets equipped with Secode.

In an effort to solve the problem, several types of signaling devices were tried before this company heard about Secode. They were all unsatisfactory because of low code capacity, high maintenance and lack of reliability.

The Solution

When Secode single tone dial-operated digital decoders were installed in the vehicles together with special alarm units for blowing the horn automatically at six second intervals, the problem was solved. All crews can be singly or collectively recalled from the job at will. False and missed calls are a thing of the past.

ADVANTAGES OF SECODE

Only with Secode selective signaling could the user get the most out of his mobile radio system. Only Secode offered system integrity, large code capacity and minimum maintenance at a very nominal cost.

Only Secode offers a system that keeps working when tubes, tuning, and voltages are off peak. Secode equipment meets OCDM (formerly FCDA) specifications for selective signaling gear. Under these specifications, it is eligible for matching funds.

If you would like to learn more about this and the many other applications for Secode selective signaling, call your nearest Secode engineering representative or drop us a note. Please address Dept.7311.

6

SECODE CORPORATION
The new name of
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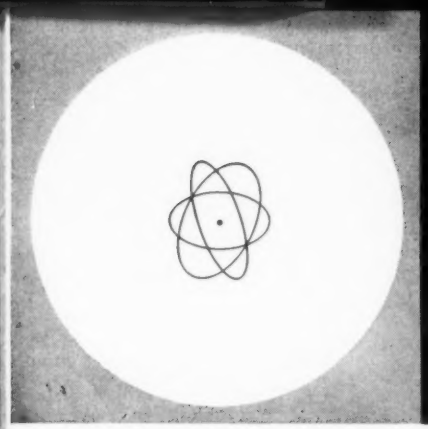


TELEPHONY'S ELECTRONICS SECTION

BY HAROLD B. McKAY, ELECTRONICS EDITOR

ELECTRONICS AND THE SMALL COMPANY

THIS IS the third year that TELEPHONY has published this Electronics Section. Inspired by the rapid development of electronics in the telephone business, the section confines itself to techniques and news items which the editors feel is of interest to telephone companies. Electronic methods have seeped gradually into the telephone plant, as they have in so many different aspects of our lives.

For the past two or three years electronics have made a bold intrusion even into such fields as children's toys. This Christmas will have even more. Radio controlled toy vehicles are already old stuff with the kids. Toy electronic kits are obtainable today that are complete with transistors, so that children can build their own radios.

The developments in electronics are so rapid that even engineers do well to keep up with their own specialized fields. Telephone men will do well to keep up with the facts of life in *their* field. But the field of the telephone man is no longer a tight little circle; he no longer talks a strange lingo all his own. He is now a part of a vast science called telecommunications, which includes everything from rural telephone lines to electronic equipment for reporting conditions on the other side of the moon.

Electronics will not come suddenly to the telephone business. Present equipment will not become obsolete overnight. Unlike the private consumer who can junk his car because he wants the latest model, a telephone company must retain its present equipment as long as it is economical to do so.

But, the companies that make telephone equipment have many irons in the fire—they are interested in outer space as well as in land lines and are deeply involved in other projects far afield from the humble handset.

You may be sure that if a new, more reliable communication device is developed for a satellite or a guided missile, it won't be long before the same gadget shows up in a telephone exchange.

These inventions come in to the telephone business as a matter of course, usually without fanfare. The semi-conductor devices, transistors and crystal diodes, were developed and proved in other fields. Today, a look at a modern relay-rack of telephone equipment may show the circuit peppered with these tiny devices. Once it took an elaborate array of condensers and resistors in a mechanical office, just to suppress sparks and avoid contact burning. Now, a tiny crystal, no bigger than a pencil eraser is soldered across a relay winding and it does the same thing. Yet, many telephone men who could locate a shorted condenser or open resistor, would not know how to test a crystal diode.

However, in a way the telephone man is fortunate when it comes to electronics. Because he is not struck by complete overnight changes, he has time to educate himself. That is, he can keep up on electronic developments in his field by reading, so that when he gets the first transistor operated relay in his plant, he will not burn the thing out trying to get it to work.

No telephone company is too small to feel the impact of the space age. Indeed, the small company is likely to feel the impact of electronics before the large one does. The 40,000-line metropolitan central office is not likely to buy a new switching device that will not mesh well with the existing plant. The 50-line Independent which is changing to dial may find that the cheapest answer to the conversion problem will be an electronic system. Indeed, the first electronic switching system is due for installation in a small central office.

The small town boy has grown up, and so has the small town. Publishers of general circulation magazines can often sense the pulse of the public from the way their magazines sell, and the kind of advertising attracted. Recently the magazine *Household*, a home service monthly with a history of 50 years of publication and a circulation of 2.5 million, ceased publication. Its circulation was mostly in small towns.

The object lesson: There is no longer a difference between reader interests in small and large towns, nor a difference in people.

Actually many small telephone companies have been long aware of this fact of life. Their subscribers are dissatisfied with "rural" telephone service, and demand the same grade of transmission and switching that the neighboring large towns now enjoy.

So the small companies have no choice in the matter. They must realize that, while they are "independent" in one sense, they are a unit in a nationwide system, and must change their plant and their thinking as required, to fit into the big picture.

TELEPHONY will continue to publish the important developments in the telephone field. The Independent telephone man, while waiting for the impact of electronics in his own office, will find in this magazine the means for meeting it when it does come.

PUSH BUTTON SWITCHING

A NEW field telephone designed and built for the U. S. Army by Stromberg-Carlson, features push-button switching. The handset is enclosed in a case which is but slightly larger than a regular telephone base. In addition to the push-buttons which take the place of a dial, the instrument has small knobs which act as volume control for transmitter and receiver.

This push button telephone, built by Stromberg-Carlson for the U. S. Army uses transistors for amplification and signalling. It works with a new electronic switching system now under development.

The instrument is part of an electronics switching system which is under development. The system, like the instrument, will be all electronic and will have no moving parts. Many new concepts in telephony will be included. The telephone set is powered by six flashlight batteries which will give about a month of service. Transistor equipment in the instrument includes all of the necessary signalling equipment, amplifiers and even power supply required for a telephone circuit operating over thousands of miles of wire and going through as many as 12 switching centers.

Instead of a carbon grain transmitter, a magnetic sound transducer is used which gives much better transmission.

Trouble in the switching system can be quickly located by means of indicator circuits. The trouble can be fixed by substituting plug-in printed wiring cards, of which only five basic types are used. The system will switch not only voice circuits, but will also handle telegraph, teletypewriter facsimile and other types of data communications. The switching unit is small enough to be carried by truck or helicopter.

MOONBEAM RADIO

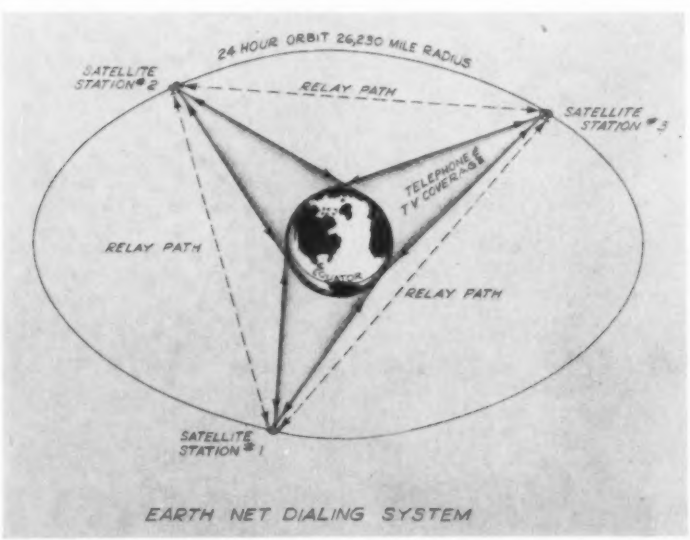
THE ITT (International Telephone & Telegraph Corp.) laboratories have been actively engaged in developing over-the-horizon radio systems. The thinking of their engineers, however, has not stopped just the other side of the blue horizon, but is well beyond into space.

Engineers Richard Waer and Andrew Batchelor of the missiles systems branch have made a startling proposal that a set of three satellites be launched for radio relay purposes. Three satellites, spaced at equal distances around a 24-hour orbit, would provide means for sending radio signals to all parts of the earth except the polar regions.

A 24-hour orbit would have a 26,230 mile radius, and the satellites would travel at 22,000 miles per hour. The satellites would thereby have "fixed" positions over different portions of the earth. Powerful microwave radio equipment would relay ground-originated television and dial telephone signals to any populated part of the world. The system, which was submitted as a proposal to the U. S. Air Force, is called the END, for "Earth Net Dial."

MEGOHMS

TELEPHONE men are accustomed to testing line insulation which has



ITT's scheme for round the world TV and telephoning would use three satellites.

a resistance in megohms. Now a tester has been made which will test insulation up to *five hundred thousand million megohms.* Mid-Eastern Electronics of Springfield, N. J., makes the device.

TRAVELING WAVE TUBE

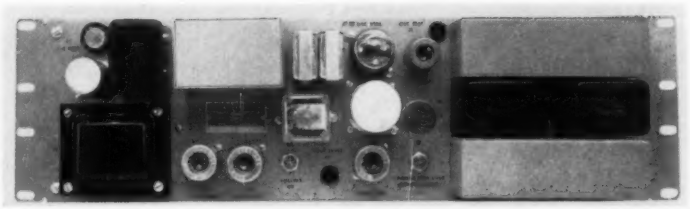
A TRAVELING wave tube which provides 100 milliwatts of power at 55,000 megacycles is under development at Bell Telephone Laboratories. The tube uses a 7,000 volt, three milliampere electron beam which is projected through a 4 inch long helix which has a bore of only 15 mils.

The laboratories are interested in this high frequency, because of the possibility of long distance transmission in circular wave guide pipes, which could be buried in the ground. The new traveling wave tube (TWT) would serve as a power amplifier at the 55 kmc frequency.

PAYSTATION CARRIER

ANOTHER new electronic development shown at the USITA convention was a paystation carrier system by Budelman Electronics. For postpay service, the carrier will handle up to seven stations on channels in the 10 kc to 140 kc range. The carrier supplies 48 volts for talking battery at the paystation terminal, and transmits dial pulses with less than 4 per cent distortion. Bandwidth of the voice channel is 600-2900 cycles within 1 db, 200-3600 within 19 db.

The Budelman carrier features 60-cycle ringing, thus no problem of generating other telephone ringing frequencies at the remote terminal, is encountered. The input ringing frequency can be anything from 16 to 100 cycles. The carrier converts this to 60 cycles at 140 volts at the station end.



This is the central office terminal of a postpay paystation carrier telephone system.

Carrier transmission is on a double sideband and transmitted carrier basis. This is the same as used by amplitude modulated radio stations. This system of transmission avoids the necessity of providing a synchronized oscillator at the receiver. The carrier frequency in this equipment is held steady by crystal control.

A feature of the Budelman System is that it uses radio receiving type tubes, obtainable everywhere.

MICROWAVE SYSTEM

THE CALIFORNIA Interstate Telephone Co.'s plant is now tied together by a "backbone" of Collins microwave equipment. The radio circuits, which supplanted open wire and cable facilities, cover 237 miles of territory from Bishop to San Bernardino, Cal. The system, which operates in the 6,000-megacycle range can provide an ultimate of 320 channels. Eight unattended repeater stations appear along the route which when complete will link together 19,000 subscribers in Inyokern, Barstow, Victorville, Bishop and other areas.

The California company had installed a Collins microwave over a short route in 1955. Plant records show that reliability of the system was 99.99 per cent.

The system used is fully compatible with other telephone equipment. Tube filaments can operate on central office batteries of 24 or 48 volts. Plate supply can come from the standard telephone 130-volt battery.

The microwave carrier equipment uses single sideband, suppressed carrier transmission. Each channel has a usable spectrum of from 200 to 3,100 cycles. Frequency diversity is used, which allows the equipment to differentiate between good and poor paths during reception difficulties. The system does not switch from path to path, but tests the paths for noise, and discriminates against the noisiest one.

Complete synchronization is another feature of the Interstate installation. All frequency generating equipment is locked to a master oscillator. However, any station can take over the functions of the master station in the event of partial outages in the system.

The Collins mechanical filter is used in the circuits, which provides a stability equal to that obtained by crystal lattice methods. Channels are grouped together in base groups. Twelve channels form such a group beginning at 60 kilocycles and extending to 108 kilocycles, with each channel 4 kilocycles wide. The base band frequencies are 420, 468, 516, 564 and 612 kilocycles.

The microwave frequencies used were chosen to prevent interference from overshoot—that is, when a signal is strong enough to overshoot one repeater and be received also by the next one. The scheme also per-

mits re-use of frequencies beyond drop out points, which are located at three different repeater stations along the line.

The complete California Interstate installation is described in the Fall 1958 issue of the *Collins Signal*. The story is well illustrated with several dramatic photographs.

MOBILE DIALING

AMONG the electronic developments at the recent USITA convention was a mobile dialing system by Motorola. The system provides for fully automatic operation from a vehicle into a dial telephone exchange. Lifting the mobile handset turns the car transmitter on; hanging up turns it off.

Calling a number is done with push buttons instead of the usual dial. The push buttons each send out the necessary tone signal to actuate the equipment at the base station. Here the tone signals are converted into dial pulses for operating the exchange equipment.

Two frequencies are used, so duplex operation, simultaneous transmission and reception, is possible. The base station is fully automatic and no attendant is required. The mobile unit features a call light which lets the subscriber know if a call was received while he was away from the vehicle.

Motorola also displayed a new MR-20 microwave equipment at the show. This is a new development and its exhibition marked the first time it was seen by the telephone industry.

TOLL DIALING

ANOTHER revised section of the REA Telephone Engineering and Construction Manual contains some interesting information on customer toll dialing. The new section, No. 157, describes the requirements, the methods, the arrangements by which Direct Distance Dialing (DDD) can be applied to the telephone plant. The section also contains tables by which traffic volume can be estimated.

PRECISION VOLTAMMETER

A NEW audio frequency voltammeter has been developed by the National Bureau of Standards. The increasing use of audio frequencies, especially in airborne equipment, made necessary the development of the device. It makes accurate voltage and current measurements over a frequency range from 5 to 50,000 cycles per second.

Because primary electrical units are maintained by dc standards all ac measurements of voltage, current, and power are actually based on transfer instruments, which are standardized on dc and then used on ac. A description and circuit diagram of the new instrument is contained in the September issue of the *Technical News Bulletin* published by the National Bureau of Standards.

AUTOMATION

A MACHINE called the "Mini-Mech," which was developed for the Navy, is capable of continuous selection of any one of a number of electronic components. It will transport these parts to a printed circuit wafer and staple and solder them into place.

PERSONALFONE

A TWO-WAY "belt" radio which will operate in the mobile radiotelephone bands is now being produced by RCA. Designed for use by patrolmen, firemen, utilities or construction workers, the outfit consists of two camera-sized cases which are fastened to a belt, for wearing around the waist. The two units together weigh only 40 ounces, including a rechargeable receiver battery and a transmitter battery good for 2,000 transmissions.

The receiver uses transistors, is sensitive to 1 or 2 microvolts, is equipped with a squelch, and delivers 6 milliwatts of audio power to a lapel speaker or earpiece.

The transmitter is phase modulated with a $\pm$ 5 kc deviation and uses seven miniature tubes. Its output power is a half watt, which the maker says is sufficient for a couple of miles range in communication with mobile stations, even greater with fixed stations.

Two models of the Personalfone are made, one for the 25 to 54 mc band, and the other for 148-174 mc band. Thus, one or the other can communicate with existing mobile services in these bands. A police department which already has radio, could furnish these units to foot patrolmen. A telephone company which now operates mobile radiotelephone service, could add this equipment without altering the present equipment. Utilities which have radios in work vehicles could add these instruments for men who must be away from vehicles. A lineman, for instance, could be called while he is on a pole.

Companies, which at present do not have radio, could use these units where one man needs to call another by radio, even though no need exists for a central station.

You can get more information about this equipment from Communications Equipment Sales, Radio Corp. of America, 1560 North Vine St., Hollywood 28, Cal.

NEW VTVM

A NEW low-priced vacuum tube voltmeter, or valve voltmeter as it is called in England, has been announced by Marconi Instruments. The new meter features a removable front panel which permits in-

spection of the components without taking the instrument apart. A picture and the specifications of this unit are given in the June 1958 issue of *Marconi Instrumentation*. You can get on the mailing list of this little magazine by writing to Marconi Instruments, Ltd., St. Albans, England.

FREE PUBLICATIONS

From time to time we receive inquiries about free publications available to those interested in electronics. Several different companies put out little publications on schedules which vary from monthly to quarterly. You can usually get on the mailing list for these magazines free of charge by writing on your company letterhead and stating your position with the company. Following are a list of some which are of interest to telephone men (please mention TELEPHONY when requesting any of these books):

Aerovox Research Worker. Aerovox Corp., New Bedford, Mass.

BRC Notebook. Boonton Radio Corp., Boonton, N. J.

Bruel & Kjaer Technical Review. B&K Instruments, Inc., 2044 W. 106th St., Cleveland 11, O.

CD Capacitor. Cornell-Dubilier Electric Corp., Hamilton Blvd., South Plainfield, N. J.

Collins Signal. Collins Radio Co., Cedar Rapids, Ia.

CEC/Recordings. Consolidated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Cal.

DUMONT Instrument Journal. Allen B. Dumont Laboratories, Technical Products Division, 760 Bloomfield Ave., Clifton, N. J.

General Radio Experimenter. General Radio Co., Cambridge, Mass.

General Telephone Technical Journal. General Telephone Laboratories, Inc., Northlake, Ill.

hp Journal. Hewlett Packard Co., 275 Page Mill Road, Palo Alto, Cal.

ITT Laboratories In the News. Public Relations Dept., ITT Laboratories, 500 Washington Ave., Nutley 10, N. J.

Kaar Communicator. Kaar Engineering Corp., Box 1320, Palo Alto, Cal.

Lenkurt Demodulator. Lenkurt Electric Co., San Carlos, Cal.

Marconi Instrumentation. Marconi Instruments, Ltd., St. Albans, England.

Meters. Industrial Products Division, I.T.&T. Corp., 250 Garibaldi Ave., Lodi, N. J.

Secode Decoder. Secode Corp., 555 Minnesota St., San Francisco 7, Cal.

Sylvania News. Sylvania Electric Products, Inc., 1100 Main St., Buffalo, N. Y.

Technique. Muirhead Instruments, 677 Fifth Ave., New York 22, N. Y.

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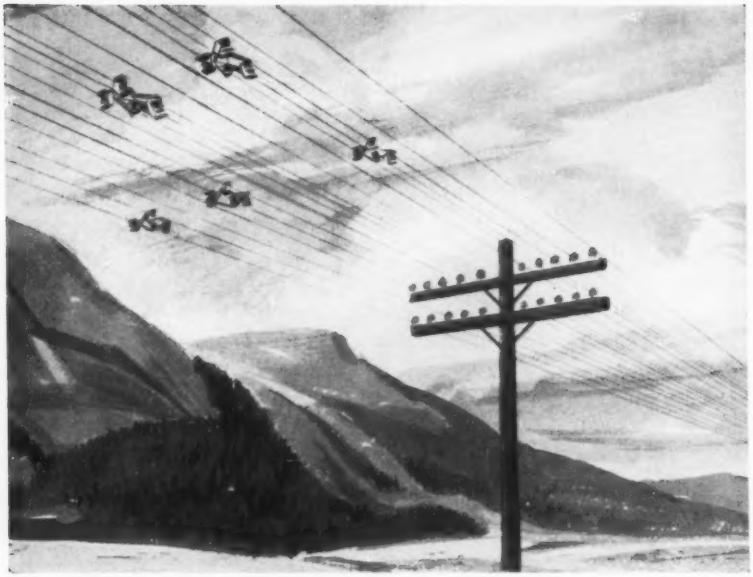

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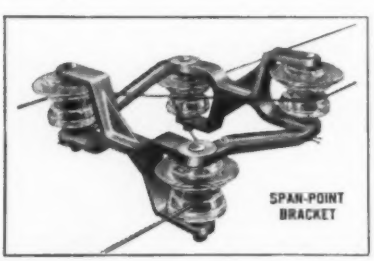
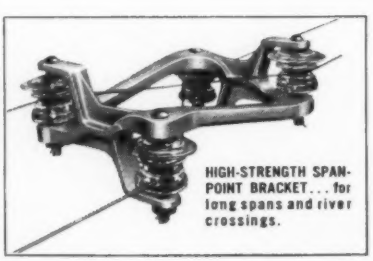


SPAN-POINT BRACKET



HIGH-STRENGTH SPAN-POINT BRACKET... for long spans and river crossings.

BURIED FACILITIES

Continued from page 28

limitation. This includes cables as large as 400-pair, 26 gauge.

Fig. 8 shows a 300-pair, 26 gauge cable. Perhaps the only unusual part of this splice is that all of the conductor joints are made at the bottom of each splice row and bent upward. This aids in keeping the compound filled sleeves in place.

Fig. 9, showing three cables, applies to junction points. A third or fourth cable can be added by means of "sheath ground tabs." The tabs are inserted beneath the bracket and provide mechanical support as well as sheath continuity for the additional cables.

One of the factors offering the greatest differences of opinions in the whole field of buried plant is the matter of depths. There are those who say, "the deeper the better," and there are those who say that burying deeper than 18 inches is a waste of money. Certain studies we have seen indicate that the latter view is more nearly correct for it has been found that in most cases of damage, the cable would have been cut if it had been 4 feet deep. Certainly, any repair work is more difficult with greater depth. We believe that the following depths are a good economical compromise between the two schools of thought.

On rear lot line easements, with no other utility facilities in the easement, a depth of 24 to 36 inches, depending upon the dependability of final grade information, is satisfactory. The service wires outside of the easement area can be in the 18 to 24-inch depth range. Where the power or other utilities occupy the easement, the depth for the cable and the wire will depend upon what is trenched in first. *Figs. 10* and *11* illustrate the different depth requirements. Similar depths apply to front lot line distribution systems.

Utility easements should be 10 feet wide, 5 feet each side of the property line when on rear lot lines or side lot lines, and at least 6 feet wide if on the street side. Cables and wires should be placed about 2 feet away from the property line to avoid damage in case fence posts are installed in the future.

If the water, sewer and gas utilities are in the street or parkways, it usually will be desirable to bury telephone and power in the rear. The telephone plant should be placed on one side of the property line and the power on the other. The power transformers should be at alternate lot line intersections from the telephone pedestals in order

Say mister, is this pole gonna be here from now on?

Maybe not from now on, but it will last for years and years. That is unless it's struck by lightning or something. This is a T-C pressure treated pole. T-C's pressure treatment makes 'em last. Our company uses T-C poles all the time. We found they last . . . almost from now on.

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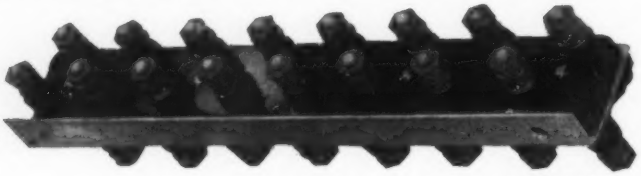
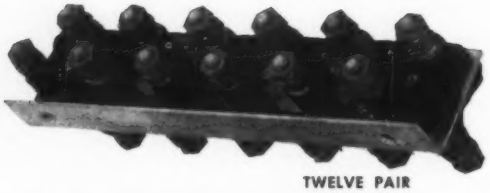
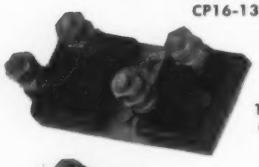


SIXTEEN PAIR
CP16-136

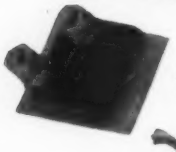


TWELVE PAIR
CP16-135

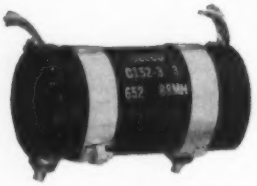
SIX PAIR
CP16-134



TWO PAIR
CP16-133



ONE PAIR
CP16-137



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to avoid crossovers, except within the easement area. A joint trench of sufficient depth and width for adequate separation of wires and cables seems attractive, but in actual practice it presents so many problems in the nature of detail co-ordination that it is seldom satisfactory. The 12 inches of earth separation is difficult to accomplish positively and getting around transformers with telephone cable, and being sure of the location of power wires when driving pedestals, are real problems. It is a doubtful economical method, except in soils which are very difficult to trench.

Certain savings in electrical protective equipment can be made where all plant, from the central office out, is also underground. In such cases, no protection at the subscribers' premises is required and the service wires can be run directly to the main telephone connections without any bridging block or splice. The customary protection is required at the customers' premises when any part of the feeder plant is exposed. It is doubtful if lightning will be much of a problem in urban buried distribution systems.

Tools, Equipment and Methods

If full advantage of buried plant is to be realized, careful consideration must be given to the kind of motor equipment, trenching machines and plows, backfillers, pipe pushers and pipe locators to be used.

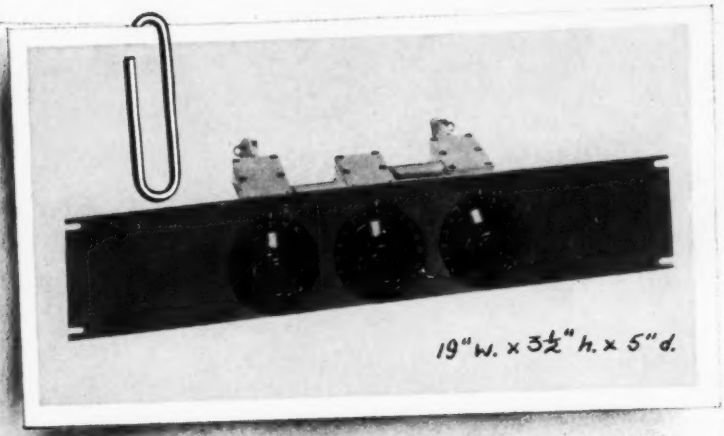
As far as trucks are concerned, any light truck, equipped to handle the cable and wire reels, will be adequate.

In most urban situations and locations, trenching will be a more satisfactory method of placing the cable and wire in the ground than any presently developed plowing techniques. There are some differences of opinion on this point, particularly under certain specific conditions, but in general at this stage of development, the most flexible method will be by trenching. There are many different makes and sizes of trenchers available which range in price from a few hundred to several thousand dollars. For urban distribution work we believe that two sizes of trenchers will do a good job under a wide range of soil conditions.

The construction forces will need a trencher which will dig a trench 40 inches deep and 3 to 5 inches wide, and with sufficient power and speed to do at least 5 feet per minute under average soil compositions. Heavy rock soils will require a larger trencher with greater digging widths.

These trenchers can be used for the distribution cables and service wires when they can be placed on a mass basis. The installation forces should

OFC



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DB/Step	10	1	0.1
Specification	0 - 50 db	0 - 11 db	0 - 1.1 db
Freq. Range	0 - 500 MC	0 - 500 MC	0 - 500 MC
Overall Accuracy	.5 db at 500 MC	.25 db at 500 MC	.1 db at 500 MC
Impedance*	50 Ω	50 Ω	50 Ω
SWR - 100 MC	1.02	1.02	1.02
SWR - 500 MC	1.2	1.2	1.2
Max. Insertion Loss DC	0	0	0
Max. Insertion Loss 100 MC	< .1 db	< .1 db	< .1 db
Power Dissipation**	½ watt	½ watt	½ watt

**Note: power rating means actual power dissipated in the attenuator and varies with power input and attenuation setting.

*75 ohm units also available.

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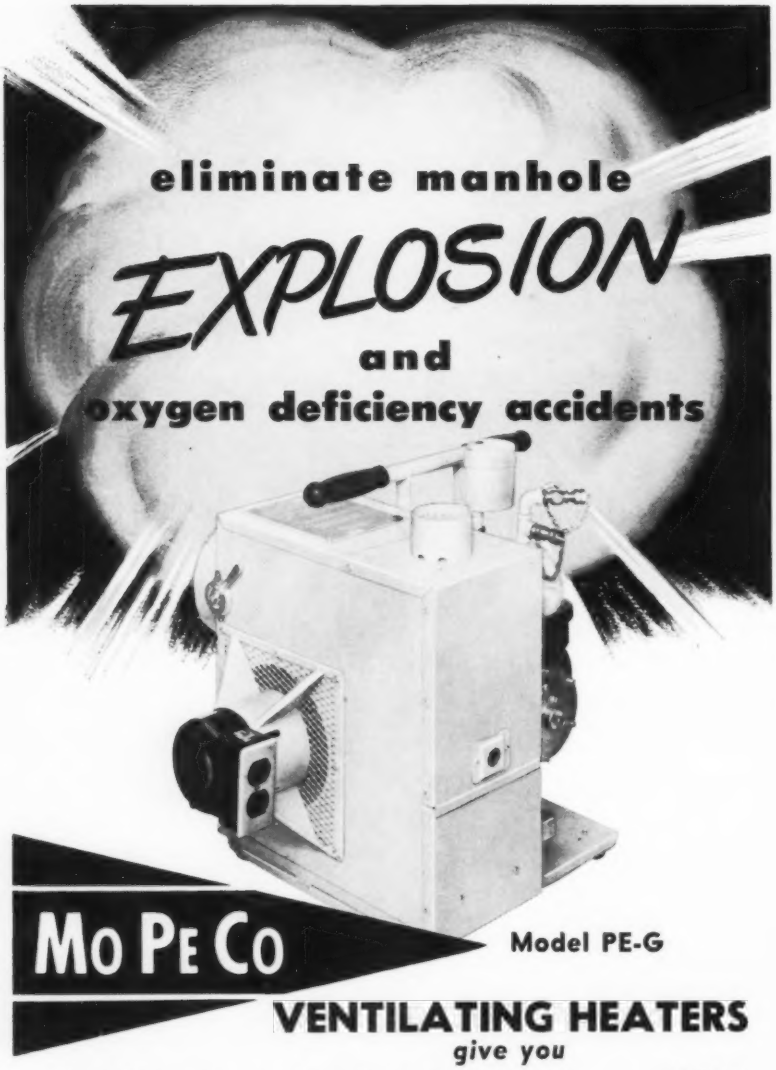

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have trenchers which can be transported and operated by one man. It should have a short and narrow width boom, preferably 24 inches by 3 inches. Several such machines are available in a price range of $1,000 to $1,800, including a trailer.

All of these standard trenchers will do a good job if properly maintained and assigned to well-trained personnel. Moving earth is a tough job and no machine will stand up unless it is kept in good condition at all times.

Several companies have done valuable experimental and development work with various designs of plows for placing cable and wires and they have been well pleased with their results. Some have used a hand plow pulled by the truck winchline and others have used tractor-pulled plows. Recent studies indicate that between 10,000 to 12,000 pounds drawbar pull is required to pull a blade at a 24 inch depth, and this means a crawler type tractor for motive power, at a cost of several thousand dollars. A combination of trencher and plow has been used successfully; the trencher started the trench for the plow at the house and at the pedestal locations. This method is probably quite adaptable to the large mass-produced type of subdivisions, but will likely prove too large an investment in equipment for the average operation.

Various kinds of backfillers, from garden rakes to tractor-mounted blades, have been used with varying degrees of success. Very little backfilling is needed with the plow-in method, which is one of its big advantages, but it is likely to disturb the earth for a couple of feet each way from the cut, and restoration may be expensive. The earth removed from the 18-inch deep and 3-inch wide trench can be raked back in with minimum effort and walking over the trench is about all of the restoration that is necessary.

There are several good makes of pipe pushers on the market but most of them require sizable pits. One experimental type, which shows considerable promise, uses a flexible steel rod with an ordinary 1¼ inch wood drill attached to it and is turned by an electric or a gasoline motor. The drill is turned through the earth at the required level and, after it is located at the end of the push, the drill itself is taken off and the wire or small cable is attached and pulled back through with the steel rod. No splicing pit is required as a 5-inch wide trench is all that is necessary. It has been used successfully for pushes up to 40 feet. Some kind of good pipe pusher is a

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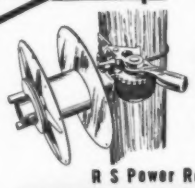
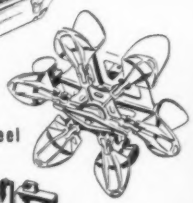
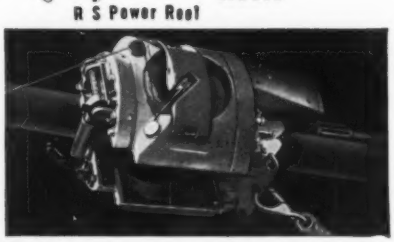
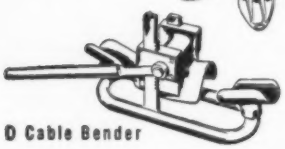

R S Power Reel


C R Power Reel

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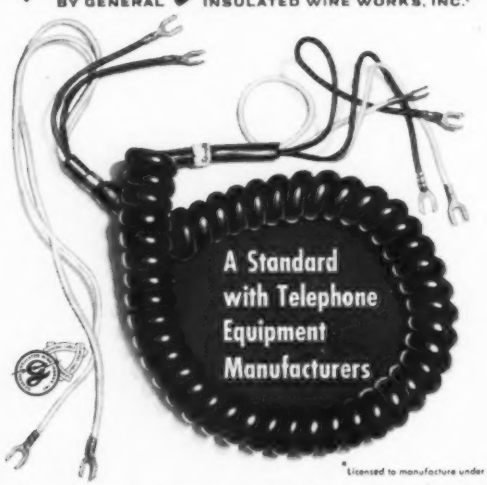

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necessary piece of equipment for a buried distribution plant crew.

Another valuable piece of equipment is a pipe locator and two or three good makes are available. These are very useful where other underground utility facilities are in the same vicinity, and they are helpful as a means of finding buried telephone cable or wire.

Buried plant of the size usually associated with a subdivision can be very effectively handled by a two-man construction crew working alone, or with a trencher operator. Considerable inefficiency usually results if more than this number of men are put on a particular job. If only needed equipment is on the job, the investment will be quite small and permitting the machines to stand idle is no real loss. It is usually better with this kind of operation to have idle equipment than idle hands. When the job is properly planned, the service wires can be placed by a one-man crew which can do the complete service order installation.

Maintenance Considerations

Most buried plant jobs have been decided pretty much on the basis of initial costs, as compared with standard aerial construction, but maintenance factors should not be ignored. So little experience has been had with direct buried plant that actual maintenance costs are probably meaningless. It is reasonable to assume, however, if the chemists are right about the life of plastic sheaths and insulation, that maintenance costs will be lower. Certainly the hurricane, sleet storm and fire types of catastrophic damage can't happen. There is little to wear out or rot out, no trees to trim and no pole climbing hazards.

The wires and cables can be cut by the gardeners' spade or by driven fence posts, but this should not happen very often if the depth and the location are properly considered. It will be expensive when it does happen. Reinforcement or replacement will, of course, be costly.

Cost Considerations

There are many factors to take into account before embarking on any kind of a buried distribution plant program, as follows:

(1) The modern curvilinear type subdivision appears to be an attractive possibility for economical buried plant, but is it fair to do a buried system in one kind of layout and not in another?

(2) Is there danger of governmental bodies legislating buried plant before full costs can be determined?

(3) Are equipment and materials available to do a complete buried job?

(4) Is there assurance that the subdivider will give the kind of coopera-

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From many convenient locations, quality Keystone Wire is available for the needs of the telephone industry. Keystone offers a full range of Class A line wire in 50M, 85M and 135M tensile strengths. All line wires meet the specifications of A.S.T.M. and A.T.&T. and are approved by R.E.A. Your Keystone Distributor also offers a full line of galvanized bond, tie and construction wire in a full range of gauges. For quality wire—and prompt delivery—contact your nearest Keystone Telephone Wire Distributor or write direct for information.

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Peoria 7, Illinois

British Ropes Canadian Fact., Ltd.
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Crescent Electric Supply Company
Dubuque, Iowa
Burlington, Iowa
Cedar Rapids, Iowa
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Mason City, Iowa
Ottumwa, Iowa
Peoria, Illinois
Quincy, Illinois
Rapid City, South Dakota
Sioux City, Iowa
Sioux Falls, South Dakota
Spencer, Iowa
Sterling, Illinois
Waterloo, Iowa

Dakota Electric Supply Co.
Fargo, North Dakota

Joslyn Mfg. and Supply Co.
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New Orleans, Louisiana
New York, New York
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Oklahoma City, Oklahoma
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St. Paul, Minnesota

Kingsport Electric Co., Inc.
Kingsport, Tennessee

Line Material Industries
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Marshall-Wells Canadian Companies, Ltd.
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The Mine & Smelter Supply Co.
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Nelson Electric Supply Co.
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Jack Pruzan Co.
Seattle, Washington

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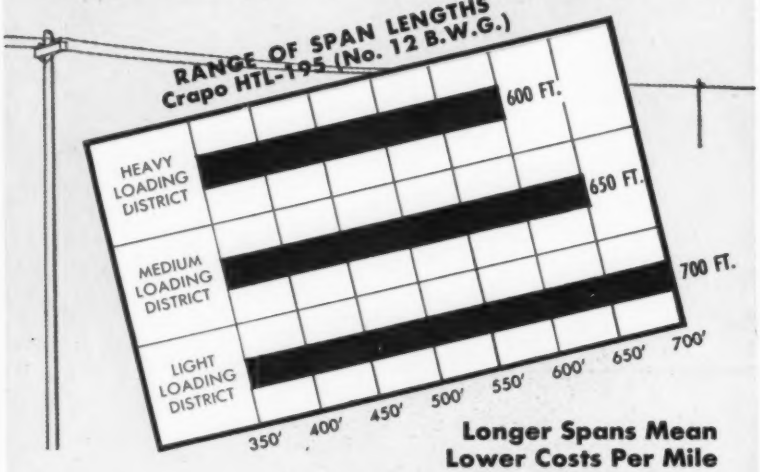
. . . by the makers of famous Red Brand Fence

Crapo HTL-195

FOR EXTRA LONG SPAN RURAL LINES

The *NEW LOWER* Resistance Extra-High Tensile Line Wire

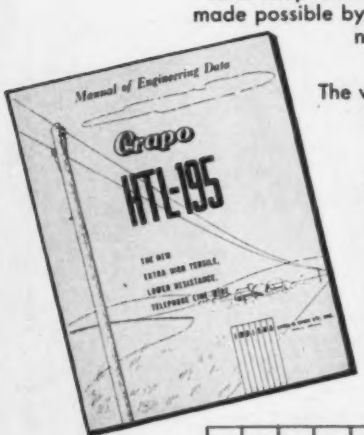


Longer Spans Mean Lower Costs Per Mile

You can cut the number of pole structures to a minimum when you use **Crapo** HTL-195 in building rural telephone lines. Extra long span construction, made possible by the high physical strength of this new wire, means marked savings in material and installation costs.

The voice transmission quality of **Crapo** HTL-195 is equal to that of **Crapo** HTL-135 and superior to older grades of ferrous wire.

Pertinent technical data have been prepared to assist engineers in designing and building extra long span lines with **Crapo** HTL-195.



WRITE TODAY for FREE COPY of the CRAPO HTL-195 "Manual of Engineering Data" No. A-195

INDIANA STEEL & WIRE COMPANY, INC.
MUNCIE, INDIANA

tion needed to make a buried system possible?

Certainly all buried plant in a small exchange would require minimum maintenance and attention and, consequently, might prove very attractive. None of the heavy construction equipment needed for aerial construction will be necessary. Some companies, which are not sure about all of these factors, have asked the subdividers to pay part of the construction costs, either in the form of doing the trenching and backfilling, or by a direct payment. Usually these costs are very moderate and most present-day subdividers are glad to help eliminate poles and wires.

As the public becomes acquainted with the advantages of no overhead facilities, there wil be pressure to replace existing aerial plant with underground plant. This will be costly except where all the present plant must be replaced as when a public improvement, or similar situation, entails the removal of a street lead.

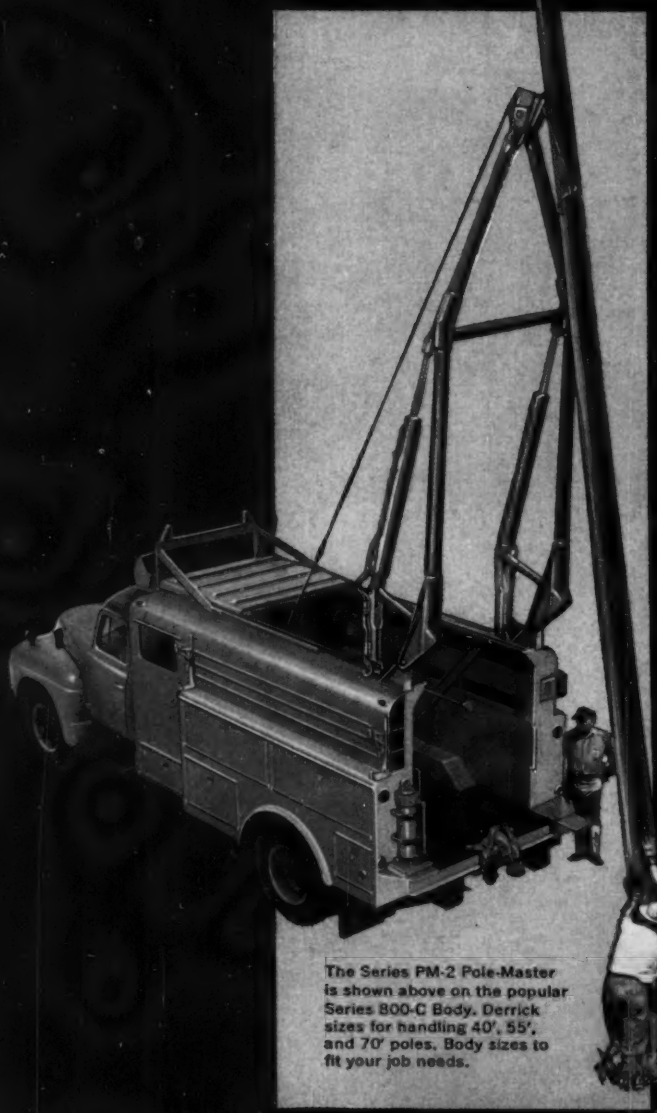
For any company considering a buried distribution system, we suggest an estimate on trenching speeds for cable work at 1 foot per minute and for service wires, two feet per minute, for one man with comparable time requirement for backfilling. The costs of all poles, anchors, bracing, strand, hardware and aerial drop wire should be fully evaluated on the aerial cost side. Good planning, favorable soil conditions, and cooperation by the subdivider should permit performance of this magnitude easily.

Conclusions

This in brief covers the over-all operation of constructing telephone distribution plant underground instead of in the air, and it may appear altogether too simple and easy. The old technical problems of pole timber, heights and sizes, anchors and guys, strand strengths and hardware are not involved and neither are any of the future pole inspections, and preventative maintenance expenses. Of course, there will be problems of co-ordination and organization until the construction and engineering forces become familiar with these matters.

We firmly believe that with modern machines, methods and materials, telephone outside plant can be placed underground at costs comparable to aerial construction in many urban areas. Further improvements in techniques will gradualy widen the economic field so that not too far in the future we will begin to see almost all new urban plant placed underground. The public will more and more demand

MUSCLES OF STEEL



The Series PM-2 Pole-Master is shown above on the popular Series 800-C Body. Derrick sizes for handling 40', 55', and 70' poles. Body sizes to fit your job needs.

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Pole-Master®

HYDRAULIC DERRICK

Touch a lever, and presto . . . powerful hydraulic cylinders raise Pole-Master from its carrying position and move it to any point within a 190-degree operating arc. Seconds later, you're all set to latch on to the load with the winch line and hoist away! To move the fully-powered Pole-Master under load, just flick the control lever again . . . that's all there is to it.

The detailed story of Pole-Master's many cost-cutting features is yours for the asking. Send for it today!

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Another reason why
UTILITIES EXPECT MORE FROM

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UTILITY BODIES AND EQUIPMENT

EARTH-MASTER HYDRAULIC HOLE DIGGER

Guided auger digs straight, clean holes in practically any soil . . . even frozen ground and hardpan. Digs as deep as 9' 4". Can be used at various angles, too.

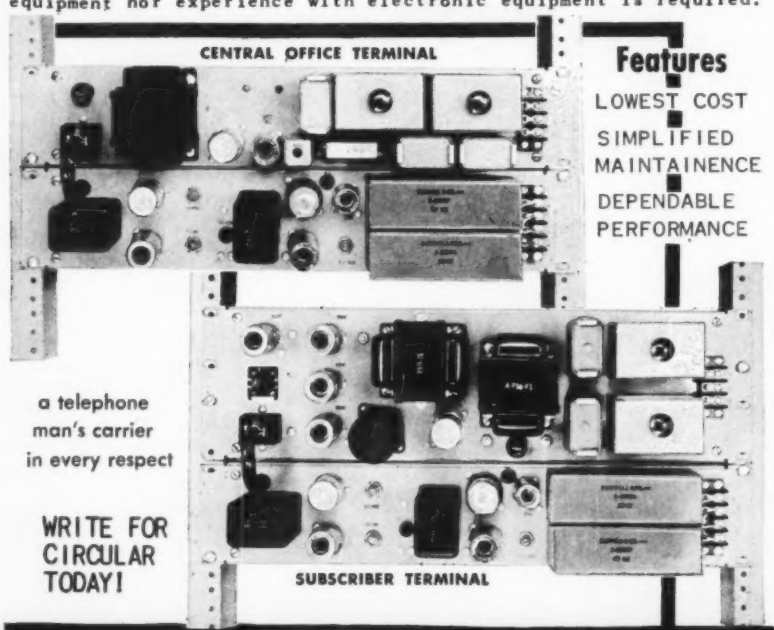
DON'T BLOW YOUR TOP
over demands for new
installations on those
"over-burdened"
party lines• • •get

low-cost
Budelman TYPE 16B
7 CHANNELS MULTI-PARTY SUBSCRIBER **Carrier**

FULLY-SELECTIVE 10 PARTY DIVIDED RINGING
SEMI-SELECTIVE 10 PARTY BRIDGED RINGING
SINGLE FREQUENCY CODED RINGING

TYPE 16B TELEPHONE CARRIER WILL:
..provide new subscriber service on party lines...upgrade service on existing party lines...create new circuits to new or expanding areas or to subscribers beyond present loop range of 1200 ohms... free a party line for private line or pay station service...provide additional trunks to remote PBX,PABX or key telephone systems...postpone cable plant expansion programs.....ALL WITHOUT ADDING TO YOUR OUTSIDE PLANT OR DISTURBING EXISTING SERVICE

Employing crystal controlled oscillators and automatic regulation, normally found only in carrier systems costing up to three times as much, type 16B AM Carrier features the lowest power consumption, fewest vacuum tubes and most simplified circuitry of any carrier system on the market. Consisting of 7 channels in the frequency range of 10-140kc it is used on any type of wire facility whose attenuation at carrier frequencies does not exceed 35 DB. Installation and operation are simple. No expensive test equipment nor experience with electronic equipment is required.



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LOWEST COST
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DEPENDABLE PERFORMANCE

a telephone man's carrier in every respect

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elimination of aerial plant. Continuity of service will be essential. These are factors which will eventually lead every utility to consider going to underground urban plant. The modern age will demand such consideration.

IT'S HARD TO CATCH UP

Continued from page 34

information fed into them. This will free men of routine tasks and give them more time to handle transactions and make decisions where human judgment is required.

Twenty years from now a Rip Van Winkle would have to do a lot of studying to catch up with the telephone industry. This would be a difficult task, and in the process he probably would overlook many details of the new developments.

A better way to learn about new developments is to keep in touch with them as they develop. This is one of the advantages of establishing a comprehensive information program. A program of this type can be planned to uncover ideas in three major groups, governed by the way a new idea or development may answer the needs of a particular operating company. These divisions are:

(1) Ideas of general interest.
(2) Ideas of particular interest.
(3) Ideas to be used.

Reading Telephony A Must

Ideas of general interest covers practically anything that is developed in the telephone industry. Without an interest in developments, in general, a company cannot pick or choose those that fit its particular needs. Information in this category would cover general descriptions of new methods, new tools, new equipment, and news items of interest to the industry.

A good way to keep abreast of ideas of general interest is to read TELEPHONY every week. Practically all of the important new ideas and developments in the industry are announced or discussed in this magazine when they are introduced or as they develop. This is one of the most important services a good magazine can render to the industry it serves.

Many new ideas and new products are discussed in TELEPHONY's "Electronics Section." Another interesting regular feature is the section, "News on New Products." New methods and new ideas are discussed in detail in articles dealing with traffic, plant, commercial, and legal problems. The advertisements in the pages of TELEPHONY are another excellent source of

(Please turn to page 87)

Rings the bell

The Volkswagen Panel Delivery Truck is just what the budget ordered for busy telephone companies. It has a capacity of 170 cu. ft. and carries a payload of 1830 lbs. Loading space is easily accessible from side or rear. Special racks and bins for tools and equipment can be easily installed. Outstanding gas economy and low operating cost mean that the bigger your fleet, the more you save.

The economy and dependability of Volkswagen performance are backed up by the VW service organization. Every mechanic is kept up-to-date through a continuous factory service training program. Speed in servicing is assured by immediate availability of Genuine VW Spare Parts through 370 completely-equipped service centers covering all 49 states.

Ask your Volkswagen dealer to show you operating costs for a Pick-up Truck, Panel Delivery, or Kombi Station Wagon. He will prove that Volkswagen savings add up mile by mile and year by year.

VOLKSWAGEN

VOLKSWAGEN DELIVERS THE GOODS...FOR LESS!

SO THAT WORDS WON'T FAIL

Every telephone man knows the heavy responsibility placed on batteries for maintaining uninterrupted service. This is particularly true in the case of ac power failure, when standby batteries must carry the full load.

To make the best possible investment in batteries, specify C & D. For lead-antimony batteries with a 14-year life—get C & D PlasticCell. If you need a premium battery—install C & D PlastiCal.® It's a lead-calcium grid battery that will last for 25 years in full-float service. Both PlastiCell and PlastiCal batteries feature full .266" thick positive plates—triple insulation—clear plastic containers. These features plus many more—make C & D your best battery buy.

If you don't have complete, up-to-date literature, it will pay you to write for Bulletins T-532 and T-533.

A typical installation of C & D batteries—neat, compact, dependable.

C&D

Since 1906

C&D BATTERIES, INC.

of Conshohocken, Pa. ... Attica, Ind.

Sales and Service Offices in Principal Cities from Coast to Coast

Manufacturers of Sure-Cell® Industrial Batteries • PLASTICELL and PLASICAL® Batteries for Communications, Control and Auxiliary Power • Producers of Autolog* • Silicon Chargers

*Trademark

news on ideas of general interest to every operating company.

These are only brief comments on a few of the ways that a good trade journal helps the operating company keep tabs on things that are new. Each of the sources of information is worthy of considerably more discussion. The key thought at this time, however, is that regular reading of a good trade journal like TELEPHONY is a good way to keep up with ideas of general interest.

Ideas of Particular Interest

The second major grouping of ideas are those of particular interest to an operating company. In a sense, one might assume that every idea in the telephone industry should be of particular interest to every telephone company. It doesn't work that way, however. The development of a new submarine cable to cover long distances across an ocean would be more of general interest than particular interest to a telephone company in Wisconsin or Ohio. An idea that would cut cable construction costs by 30 per cent not only would be of general interest, but of particular interest to the Wisconsin or Ohio company.

Ideas of particular interest are those of general interest which have a specific bearing on a problem in which the company is vitally interested. As a rule, more information should be gathered about ideas of particular interest. The manufacturer or distributor of a new system, tool, or product, is an excellent source of such additional information. The state association office may have useful information on ideas that involve policy decisions.

Speaking in general terms, information must be gathered on an idea of particular interest to determine whether or not the idea will be used. Once the decision is made to use a new idea, the gathering of information moves into the detail stage. This may involve drawings, specifications, size, weight, ordering details, and similar items in greater or less degree as required. As a rule, additional data is secured from many of the sources from which information on the new idea was received originally.

Public Has a Stake

The public has a stake in progress, too.

The telephone company has a responsibility to its customers and to the public which is not paralleled in industry in general. Ideas and developments that provide more and better service improve the standard of living, just as does progress in agriculture,

FEATURING A COMPLETE LINE
OF
SERVICE AND MAINTENANCE BODIES

The SERIES S-X SERVICE BODY features both front and rear VERTICAL door arrangement to utilize every inch of Body space.

The design of the SERIES S-X Compartment layout purposely encourages the storage of heavy material ahead of rear axle and lighter equipment in the rear. Rear vertical compartments are supplied with hooks to provide hanging of ropes, belts, and climbers. Horizontal and front vertical compartments contain material shelves, parts bins, and adjustable trays for storage of heavier tools and supplies on top of and ahead of rear axle. SERIES S-X SERVICE BODY provides three or more large compartments completely eliminating small, useless catch-all compartments or deep wells.

OUTSTANDING FEATURES INCLUDE:

- **Double mouldings around all door openings providing doors with triple sealing action keeping compartments water tight.**
- **Rub Rail to protect sides of body.**
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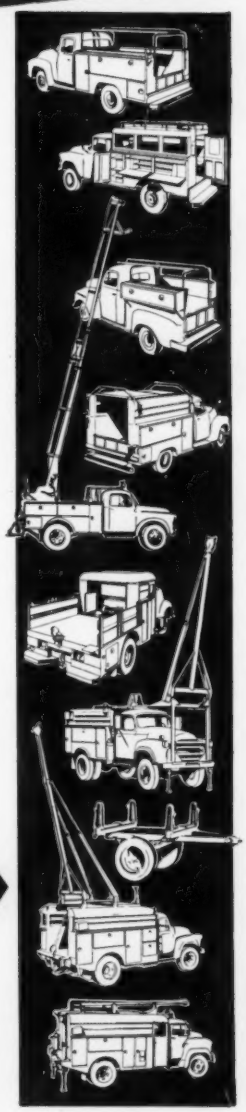
- **Chains supplied so that horizontal door provides a horizontal work table when open.**
- **Precise workmanship and careful finishing result in equipment on which you are proud to display your name.**

Tell us your problems. Utility Body's Custom Design Service solves them by building to your requirements without additional cost.



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There IS a UTILITY BODY to fulfill YOUR OWN Specific Requirements! Contact UTILITY BODY COMPANY for data on the SERIES S-X SERVICE BODIES or telephone your nearest distributor for complete information on UTILITY BODIES.

UTILITY BODY CO.

1530 WOOD STREET • OAKLAND 7, CALIFORNIA • TWINOAKS 3-8980

C. J. Reynolds, National Supply Sales Manager, is always ready to deliver the goods.

Very special delivery

When you need something in a hurry, your supply order gets *very* special attention. Of course, your routine orders get quick service too, thanks to the way our supply setup is organized.

With branch offices and warehouses in five key locations, we can give you *good delivery no matter where you are.* We operate enough supply facilities to give you the service you want—yet not so many that the distribution system becomes unwieldy and inefficient.

To Chet Reynolds, who manages our national construction and maintenance supplies setup, every one qualifies for the "V.I.P." treatment. Your smallest order gets the same careful, personalized attention as your largest.

That's the spirit that prevails at all the Stromberg-Carlson branches. And that's why it pays to order your construction and maintenance supplies from the branch office in your area.

"There is nothing finer than a Stromberg-Carlson"

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

SALES OFFICES: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

Electronic and commu· ication products for home, industry and defense

"XY" T.M. REG. U. S. PAT. OFF.

education, public health, and similar essentials.

In these other fields, there usually are many places to which the public can turn for the products or services that add up to a standard-of-living improvement. There is only one telephone company. As a result, it is an obvious fact that the telephone company must be in a vigorous financial position so that it will be able to make best use of new developments. Expansion and improvements cost money. The telephone company must be able to compete with other industry to secure needed new capital at the most favorable terms. If the rate of return is too low, investors will divert their funds to more profitable channels. It's even possible that, under adverse conditions, the telephone company could have no sources for new money for capital improvements. Even the best laid plans are valueless if no money is available to put them into action.

From this it can be seen that progress of the telephone company is gained by teamwork on the part of both the company and the public.

The company must provide quality service that supplies the public need. To do this the company must be ever watchful for indications that improved or additional services are required. New ideas must be investigated and analyzed. Steps should be taken to provide additional, new or improved services when they are required.

Adequate Rates Vital

The public must provide a wholesome atmosphere to permit the company to develop and progress on a firm foundation of financial success. The public should be certain there is not the slightest possibility of confiscation in the rate structure established for the company.

A word of praise and encouragement has been earned by the members of many state regulatory commissions. These commissions recognize that progress and high quality service depend on adequate rates. The members of these commissions demonstrate their integrity by supporting a pattern of enlightened rate structures. They are performing an exceptional public service and deserve wholehearted support and respect.

On the other hand, it is a sad criticism of democratic government that a number of state regulatory commissions seemingly are controlled by short-range political expediency. These commissions evidently believe they act in the public interest when they set rate structures that weaken a company's financial condition. In the long-run this amounts to betraying the public's trust. Regulatory commissions in this group are not worthy of public respect and support as long as they take action that confiscates private capital contrary to the best interests of the public. These words are harsh and they are meant to be. There are too many people working for progress in communications to condone the irresponsible few who, by thoughtless decisions, place the integrity of telephone service in jeopardy.

In summary—the face of the telephone industry is changing. It's a gradual change—almost like the way nature changes a landscape. How well a company will prosper in the future depends on how well the company adopts and uses new ideas and new concepts. The best way to be sure of the future is to set up and follow an objective program of keeping up with things that are new. The rewards are priceless. Set up a program today—it's easy to keep up with new ideas.

Radio-Telephone to Connect 10 Caribbean Islands

By the end of 1958 10 Caribbean islands are scheduled to be linked, for the first time in their history, by a comprehensive radio-telephone system to be installed by International Aeradio (Caribbean), Ltd. it was reported on Nov. 17.

The network of ground-to-air and inter-island VHF radio stations, said to be the world's largest, will connect Trinidad, Grenada, St. Vincent, Barbados, St. Lucia, Martinique, Dominica, Guadeloupe, Antiqua and St. Kitts.

Tell-Tale Evidence

"It is an impudent kind of sorcery to attempt to blind us with the smoke without convincing us that the fire has existed."—JUNIUS.

Answers To Questions On Page 38

(1) The local operator should acknowledge the order, and pass to the long distance operator, any details of the call which she may have received. In a combined toll and local automatic office, she will complete the call.

(2) No, such calls are now completed direct.

(3) Calls to Hawaii are ticketed and timed in the usual way, by the OTC operator.

(4) A 15 second timing allowance is given on calls to Hawaii.

(5) No.

This wire delivers very special savings

Save 10 to 15 (or more) poles per mile by using Crapo High-Tensile Telephone Wire in long-span construction.

With fewer pole structures you get big savings in time, labor and materials—maintenance, too. You have a choice of three types:

Crapo HTL-195: The New Extra High Tensile, Lower Resistance Telephone Line Wire makes possible spans up to 600 feet in heavy loading, 650 feet in medium loading and 700 feet in light loading districts.

Crapo HTL-135: Makes possible spans of 350′ in heavy, 450′ in medium and 500′ in light loading areas. Ideal for new extensions and for replacement of old lines.

Crapo HTL-85 (No. 12 B.W.G.): Permits spans of 225′ in heavy, 325′ in medium and 385′ in light loading districts; provides stronger spans on existing pole structures.

These wires give superior telephonic transmission qualities. When you order telephone line wire from the Stromberg-Carlson Branch Office in your area, specify these products of Indiana Steel & Wire Company.

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

SALES OFFICES: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

TELEPHONE COMPANIES

Use this fast portable trencher for cable, pipe, tubing, conduit

POW-R-SPADE narrow trenches cost 1c to 5c per foot including labor.

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Saves 80% - 90% cost and time compared to sub-contract or hand digging.

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Ready to go on the job, at once — no costly waiting around.

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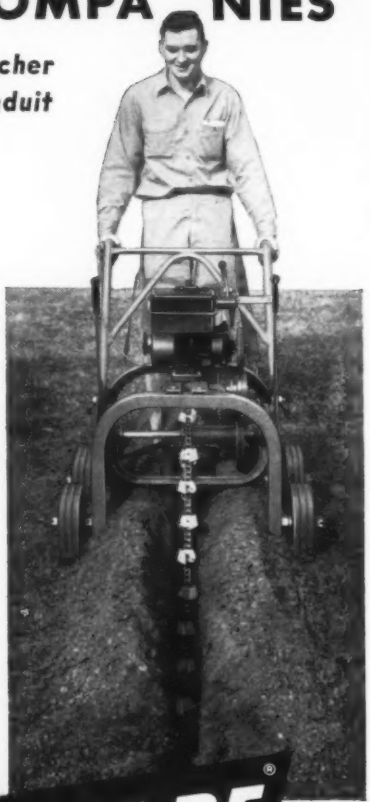
Can pay for itself in one day's operation.



POW-R-SPADE digs a neat 3" wide trench. Dirt is delivered well pulverized on each side of trench — no lumps or clods. Easy to back fill.

STAMPINGS

POW-R-SPADE®

MADE BY STAMPINGS, INC. Davenport, Ia.

Portable from job to job. Easily handled by one man.

APPROVED and recommended by hundreds of users in every area of the United States.

Get more facts about the earning power of POW-R-SPADE.

WE ADMIT that these are strong statements. And yet, POW-R-SPADE users confirm them again and again. For here is a machine that is ideal for trenching 3" wide to 24" deep, where larger machines are costly and impractical; where hand labor is slow and expensive. No heavy wheel marks or unnecessarily wide trench to scar lawns. Digs right up to foundation of building. Goes 1½ to 17 feet per minute, depending upon soil conditions.

A rugged machine. Easy to set and to operate. Oil-sealed bearings. Powered by a well-known engine. Minimum maintenance. Shipped completely assembled, ready to go to work for you. Additional interesting details and information immediately yours upon return of the coupon.

Stampings, Inc., 1017 Mound St., Davenport, Iowa

Please send literature on POW-R-SPADE to:

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Company_____

Street_____

City_____ State_____

SMALL COMPANY'S STAKE

Continued from page 20

tion and labor which could be unnecessarily expensive and even unrealistic on the local scene. Local management can be flexible and versatile in such respects.

(3) *Utilizing Local Resources.* The long history of most small companies is one firmly grounded on the confidence of local people in the future of *their* community and the telephone service serving that community. It was in this way that the original investment was obtained from the small town doctor, lawyer, merchant, and farmer. This formula is still as sound as it ever was.

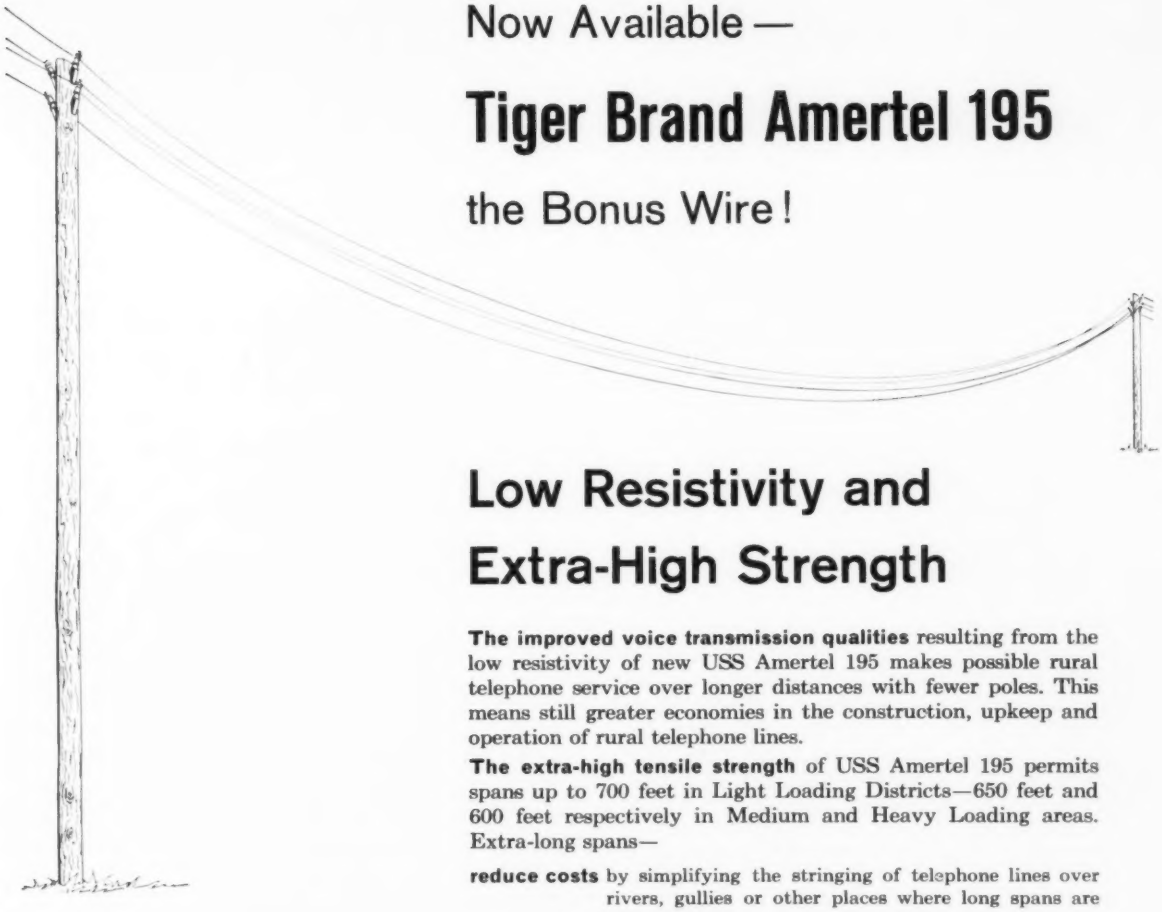
Financially, it may be necessary nowadays to look to commercial banks or other sources for funds to take care of the investment needed for plant modernization and expansion. But, the confidence of the home town people, in the future of their own community, and in the future of the home town telephone company, is something that must exist before even the outside financial backer would be willing to risk lending his support. Even the federal Rural Electrification Administration (which has the undeserved reputation, in some quarters, for handing out money without too much regard for local justification) seriously considers such angles as the local reputation of the borrowing company, and the proven ability of its management to do the necessary service job.

Only last week in Washington, D. C., this writer learned, through a press conference, that the REA's 17-man telephone advisory committee had considered, among other things, the need for stream-lining and simplifying engineering contracts and loan procedures. For what purpose? To place more emphasis on the local scene, to cut red-tape so as to have work done on a local basis which might save time and money.

Importance of Local Management

The key to the small company's future, in every case, is management. No telephone company, big or small, is any better than its management. But, a small company must especially depend on management—as an engine depends on its ignition—to furnish the vital spark to keep operations going.

This does not mean that a good small company management must be the product of some fancy engineering college or have a background of broad industrial experience. The management of a small company, which has grown up "from the inside" to the responsibility of its job, is very often the ideal combination for that particular company—provided there exist two additional



Now Available —

Tiger Brand Amertel 195

the Bonus Wire!

Low Resistivity and Extra-High Strength

The improved voice transmission qualities resulting from the low resistivity of new USS Amertel 195 makes possible rural telephone service over longer distances with fewer poles. This means still greater economies in the construction, upkeep and operation of rural telephone lines.

The extra-high tensile strength of USS Amertel 195 permits spans up to 700 feet in Light Loading Districts—650 feet and 600 feet respectively in Medium and Heavy Loading areas. Extra-long spans—

reduce costs by simplifying the stringing of telephone lines over rivers, gullies or other places where long spans are necessary.

reduce costs by making it possible to string telephone lines on rural power lines without the use of intermediate supporting poles.

reduce costs by cutting down on the number of poles required, with subsequent savings in man-hours, hauling, hole digging and installation.

Because of the extra-high strength of USS Amertel 195, it performs well under heavy ice loads, keeping service interruptions to a minimum. Often ice-coated Amertel 195 will touch the ground in mid-span. While the wire is resting on the ground, the ice sheath serves as an insulator . . . service continues, uninterrupted. After the ice load is removed through melting, the wire will return to its position in the air.

New folder tells the full story on USS Amertel 195. Just off the press, this new folder gives full information on this outstanding new telephone wire. For a free copy, send your request to American Steel & Wire, Room 842, Rockefeller Building, Cleveland 13, Ohio.

USS, Tiger Brand and Amertel are registered trademarks

USS Amertel 195 Specifications

Size B.W.G.	No. 12
Nominal Diameter in Inches	0.109
Minimum Breaking Strength (Pounds)	1800
Resistance per Mile (Ohms) Maximum	38.8
Approximate Weight per Mile (Pounds)	170
Approximate Weight per Coil (Pounds)	160
Minimum Weight per Coil (Pounds)	144
Maximum Weight per Coil (Pounds)	176
Approximate Length per Coil (Feet)	4970
Minimum Length per Coil (Feet) Approximate	4470
Maximum Length per Coil (Feet) Approximate	5470

American Steel & Wire Division of USS **United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

and indispensable attributes: (a) Intelligent ambition, and (b) a confidence in the future of the company. Without these, no banker would lend a nickel, nor should he. Without these attributes there can be only a bleak future because a management that does not believe in itself cannot expect others to believe in it. Once that indispensable condition is established, however, the intelligence of a sure and willing management will prompt it to take the other necessary steps to keep the company in the race for the prize of future success.

Too often we see or hear examples of small company management which has gotten itself into a defeatist state of mind. Not long ago this writer heard of such a case where a long-established small company executive somehow became convinced that competitive interests were "out to get him." Once this illusion lodged in his mind, imaginative fears supplied the fancied corroboration at every turn. Every major complaint, every administrative setback, every controversy of any kind was viewed with suspicion.

Fortunately, this executive had a realistic friend in the manufacturing industry who was smart enough to go to the source. Imagine the small company executive's embarrassment when he found out certain industrial interests, which he thought had designs on his company, had *never* entertained such a thought. On the contrary, when the situation was talked over, on a confidential basis, the larger commercial interest was only too happy to cooperate in assisting the local manager to put his house in order and get back on the ball. Hope revived and the company is still very much on the upgrade.

Must Find Truth

This small company must be nameless, for obvious reasons. It so happened that it was located in a spot where it could *best* perform essential public service for years to come. The rest of the industry in that area knew it. The state public service commission knew it. Even the local people were instinctively aware of it. *The only one who had doubts was the managing executive officer himself!* When these doubts were cleared away, he went to work with a will and things are humming today in that area.

It might be well for many small company officials to examine themselves in this way. If suspicions are harbored, the best way to clear them up is to go out and find the truth. But one must find all of the whole truth, not just part of it. One must find out what is needed, and what will be needed in the future, *to do a full and complete job!* One may also find, in the process, that others in and out of the industry are willing to help, when they see a company management with the courage and good sense to help itself, in such a situation.

A very high telephone industry official recently told this writer, in discussing this subject: "There are many things in the telephone business which my company is not interested in doing, and which it could not do as well as they are being done, even if we were interested. These are things, however, which need to be done in many places. But, we sometimes have trouble convincing the people already on the job that they belong there, and that they ought to stay there for the benefit of the whole industry."

There is a thought here for all telephone companies, large and small. It might be summed up in three questions. (1) Do I belong where I am? (2) Can I do what is needed? (3) Do I deserve what I have? If the answer to all these is "yes," there is no longer any doubt. The opportunity of the future will be limited only to the ability and energy of the small company management to realize its full potential.

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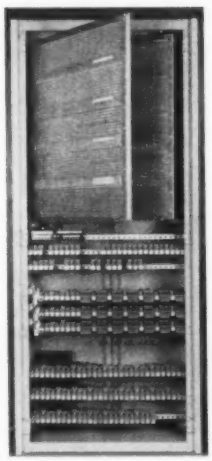
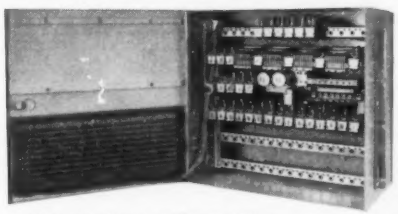
UNIVERSAL COMPUTER INTERCEPT*

FOR INSTALLATIONS IN END OFFICES OR TOLL CENTER TO SERVE ANY NUMBER OF SATELLITES



Pictured left: Cabinet 84" x 36" x 12"; Capacity 40,000 stations, TPL or TPS or any combination of both.



Pictured above: Cabinet 19" x 17" x 11" for rack or wall mounting; equipped for 60 lines TPL or 600 station TPS. Capacity 200 lines or 2000 stations.

FOR ANY SIZE INSTALLATION

FROM 40 LINES UP IN INCREMENTS OF 20 LINES

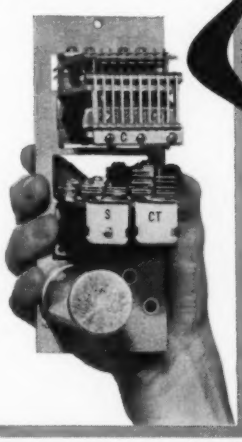
- Increase your Schedule "A" commissions.
- Increase available trunk usage time.
- Save time and material on intercept service.

Selective (Two-way) Intercept, to operator and recorder, is available.

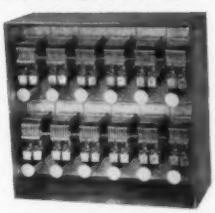
UNIVERSAL DIGIT ABSORBER*

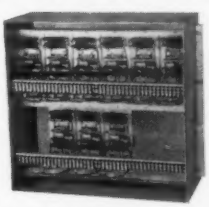
The world's best switch for converting existing switchboards into full 2-5 numbering

This illustration shows relative size of one unit comprising an impulse counter, relays and condenser; each unit is completely wired and tested for rapid installation and future expansion.



UNIVERSAL CODE-TO-SELECTIVE RINGING CONVERTER*





New economical equipment for converting code-ringing switchboards into full selective ringing . . . *for use with existing equipment!* Pictured above, front and rear view of typical relay case for Ringing Converter for mounting on standard 19" rack. Each unit shown is a conversion component for an individual connector, and is cabled to the switchboard.

TRUNK DIGIT REGISTER UNIT*

May be applied to "Trunk on Line" dial units where five or more digits are required to be delivered to a 3 or 4 digit tributary exchange. It will increase link hunting time interval, eliminate partial registration of dial pulses, and allow maximum use of links for local calls or toll connections.

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Check your business customers . . .
Then reserve a spot in our 40A PABX schedule

Leich's 40A PABX has a wonderful market. We wish we could talk with each of you personally about the happy experiences many telephone companies have had with it. But since that's just about impossible, we're using this ad as next best.

Stated simply, the demand from business customers for Leich's 40A PABX has been terrific. In fact, several telephone companies have now sent us standing orders for several Leich 40A PABX systems a month.

They have been installed in a wide variety of businesses. Offices, factories, banks, schools, motels, prisons, and hospitals all have them.

No doubt your customers too, will want the Leich 40A PABX. Write for our catalog today. Show it to your PABX customers. Then we're sure you'll want to reserve a spot in our 40A PABX schedule.

The

LEICH 40A PABX

with the exclusive Keyset Turret

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Installation at Celotex Corporation, Fort Dodge, Iowa

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1. Peat Marwick Mitchell & Co., Honolulu, Hawaii
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4. La Porte Savings Bank, La Porte, Indiana
5. New Moon Homes, Alma, Michigan
6. American Bank & Trust, Monroe, North Carolina
7. Standard Oil Company of Texas, San Angelo, Texas
8. Wisconsin Cooperative Creamery Association, Union Center, Wisconsin
9. Celotex Corporation, Fort Dodge, Iowa
10. Carus Chemical Co., La Salle, Illinois

9 Features You And Your Customers Will Like

1. Exclusive Keyset turret is smaller than a typewriter.
2. Inside, outgoing, and consultation calls are made without help from the turret attendant.
3. Capacity of up to 40 lines, 6 local links, and 10 city trunks.
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6. Night answering by any telephone.
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8. Power failure transfer automatically connects city trunks to pre-assigned stations when commercial power fails.
9. Public address system adapter (optional).

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PLANT MAN'S NOTEBOOK

Continued from page 36

thorough check when there is even an indication that a new business is contemplating a move into an Independent Company territory. Actually, good telephone service is more valuable and necessary to a business concern located in a suburban area than in a downtown section of a city.

Some managers of small Independent Companies get panicky when faced with the problems of furnishing service to a new development or business, but this is not necessary and it never is any help. It is merely necessary to check all available means and provide the service in the best and most economical manner.

If you have an open wire lead near the new activity, perhaps subscriber carrier can be used advantageously to provide the required service to the building contractor. This same carrier may also be utilized after the contractor has finished his work to furnish service for the new business until permanent facilities can be provided.

If the use of carrier does not prove desirable, then perhaps rural distribution cable will meet the preliminary needs. This cable can generally be strung on open wire leads, cable pole lines or on a power lead. Few building contractors will start work on a large building project until electric power is available to the site.

Often, too, when a good pole line is available, aerial cable can be installed to provide permanent service to a new activity. In other locations, it may be necessary to construct an underground conduit system from the exchange for a part of the distance to provide the necessary increase in cable capacity. The remainder of the distance may utilize aerial or possibly buried cable, whichever proves the more economical and desirable.

When a cable to a new activity becomes overloaded, short-haul carrier can often be used to advantage to provide additional circuit capacity. This often proves an advantage when an existing cable does not have the capacity to provide the required facilities on a physical circuit basis.

Buried wire and cable can also often be used to provide additional facilities when required quickly. This type of construction often can be used to advantage in isolated areas where suitable pole lines may not be available.

If a considerable amount of this type of construction is to be utilized, consideration should be given to obtaining the services of a contractor. Several

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ONLY 3 SIZES for all applications
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POSITIVE SETTING with TRI-PRONG action
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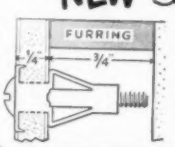

For furred wall board, hollow doors, etc. Space "in back" can be as little as ¾-inch! Panel thickness can be ⅛" to ⅜". Specify size 455.

WING-DINGs are perfect for securing objects to hollow walls, floors, ceilings (wallboard or lath and plaster), glass, ceramic tile, plywood, sheet metal, etc.

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Easy... Lightweight push-button can makes Kearney Rust Cutter easy to use on ground or poles. Atomized mist dissolves crystallized rust.

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Specify
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Products
386

good contractors are now equipped with suitable plows and are able to do good work at a reasonable cost.

For the installation of lesser amounts, small gas-engine-driven trenchers may be purchased at a reasonable cost and will probably pay for themselves on the first job. These trenchers dig a narrow trench suitable for burying cable and, because of the small amount of earth disturbed, backfilling is not a problem.

Neither should the use of microwave be overlooked when service must be furnished to a new activity in an isolated location. This equipment has been improved, its cost reduced, and its maintenance simplified to a point wherein it can often be proved in over older methods of communication.

The Independent telephone industry is suffering growing pains and from all indications these pains will continue for some time into the future. Undoubtedly, many of the small and medium-sized Independents will increase in size considerably.

It is most necessary that this growth be well planned so that every operating company may furnish the required grade of service acceptable to our nationwide system and in so doing earn a reasonable margin of profit.

VIRGINIA CONVENTION

Continued from page 47

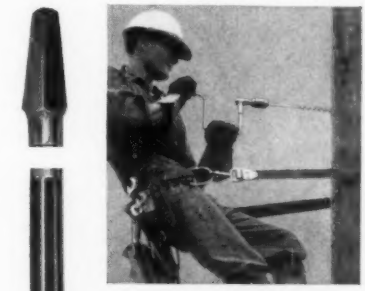
as) . . . how readily we can pay the interest charges on our funded debt. By dividing the interest charges on funded debt by the amount available for income, before fixed charges, we determine the number of times which the company earned its interest charges. A public utility company bond is generally considered a safe investment when interest charges are earned by two-and-one-half times."

In addition to the balance sheet and income statement, Mr. Pittman mentioned a number of supporting schedules, including analysis of surplus, which he says is the major component of a rate base. It is also the basis of depreciation computation and it provides data relative to unit construction costs. Another supporting schedule is taxes, which should reflect the tax as being either prepaid or accrued. An important supplement is telephone data, since management, he says, is continually interested in station gain and development.

He also mentioned operating expense accounts as being another requirement for budgetary control. Equally as valuable as everything else mentioned, Mr. Pittman said, is that all management personnel should be taught how to read and interpret statistical information.

Finances, as involving the state of

ONE BIT FITS BOTH



1. Hand Brace

2. Electric Drill

New Irwin Adapter Shank Wood Bit

Now you can eliminate the need to stock two types of wood auger bits. Irwin's new Adapter Shank Bit fits both hand braces and power drills.

With hand braces, use the Adapter Shank Bit as it comes. Cut off taper square and the Adapter Shank, with its 6 "hex flats", chucks perfectly in power drills or hand braces, either one. No wobble, no run-out. Clean, efficient cutting action. Reduces inventory and record keeping by 50%. Saves time on the job, too. Call your distributor, or write today for complete information. Sizes 4/16" to 17/16", both solid center and single twist types.

***All Irwin Adapter Shank Wood Bits** are forged in one piece from special steel and heat tempered full length for longer life. Plastic coating on balanced cutting heads guarantees factory-fresh sharpness, unequalled performance. Widely used by utilities, electricians and construction workers.*

IRWIN auger bits • screw drivers
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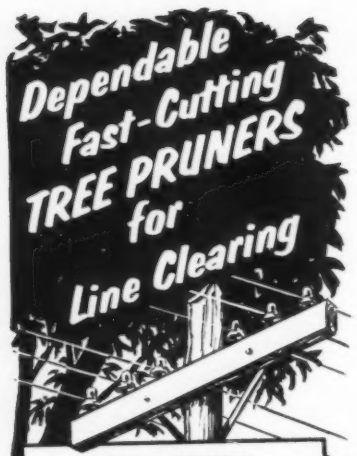

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Cuts up to 1½" branches. Pruner head is malleable iron casting, husky, unbreakable. Smooth, easy cutting action.

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Heavy duty, fast easy cutting loppers designed for utility use.

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The famous "Tiffany" pattern lopping shears 25" and 30" models. Cut branches up to 1¾".

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Virginia, were discussed by Honorable Jesse W. Dillon, member of the Virginia Corporation Commission, who explained how the state had managed to reach a sound economic footing in spite of such catastrophes as the Civil War and shortsighted facility planning and unrealistic financing.

Also presented at the convention was the report of the association's small company committee, which detailed how it helped the New Hope Telephone Co. and the Walker's Creek Telephone Association, in matters such as construction of new plant, and in the provision of new equipment, during the year.

Another committee, the foreign exchange service committee, presented to the association a foreign exchange tariff approved by the Virginia Corporation Commission. The Virginia association had been asked to draw up the tariff by the corporation commission.

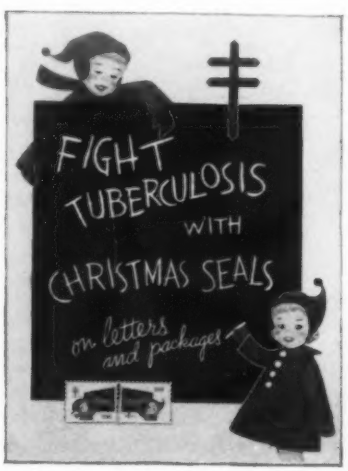
Other features of the convention included the report of the President, Harry P. Cavendish and the Secretary-Treasurer, Wilson B. Garnett.

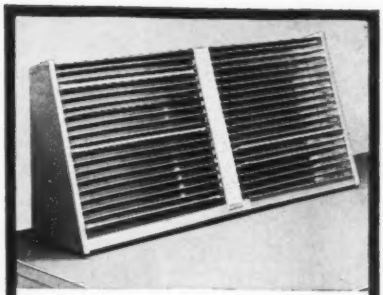
The association elected the following directors:

Warren B. French Jr. of Edinburg, A. G. Stogdale of Staunton, A. E. Reynolds of Bristol, W. Tayloe Murphy of Warsaw, Harry P. Cavendish of Harrisonburg, C. Lacey Compton of Manassas, W. B. Garnett of Charlottesville, Frank A. Hoffman of Bluefield, W. Va., P. T. Campbell of Hanover, K. E. Schuler of Farmville, C. J. Logan of Tarboro, N.C., Stanley A. Owens of Manassas, Virl L. Choate of Martinsville, L. Vernon Snyder of Lexington, and L. John Denney of Amherst.

The directors elected the following officers:

President, Mr. Logan; secretary-treasurer, Mr. Compton; first vice president, Mr. Garnett, and second vice president, Mr. Choate.

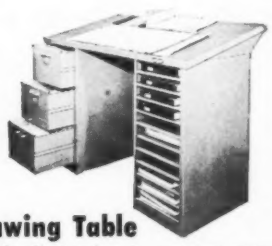




Trouble Recorder Card Rack
For fast orderly sorting of Trouble-Recorder cards, has 38 card slots in two banks with index strip between. Base is 38" by 8". Height 15". No. D30225-1.

Telephone Office Equipment
to lighten your work and improve efficiency

Work Bench
For repair, assembly, test and paper work. Top drawer divided into 24 compartments for parts and tools. Large file drawers are for circuit drawings. 54" x 25" top covered with masonite. Height 36". Drawers may be inserted from back to reverse position of kneehole. No. D29978-3.



Drawing Table
For circuit drawing in crossbar offices, provides central location for reference material. Masonite top is 30" x 60". Height 36" at front, 42" at rear. Three large file drawers at left for drawings. Eleven shelves at right are 2½" high, 14" wide, 18" deep for sketches, sequence charts, book type SD sheets, trunk serials, etc. No. D30326-1.

Color of all units: Baked-on gray enamel unless otherwise specified.

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Dependable Power

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COURTS AND COMMISSIONS

Continued from page 68

The high court upheld a 1956 order by the commission reducing Southern Bell rates by almost 4 million dollars.

Southern Bell contends even the increase the commission said it found was permissible is inadequate. The company asked for 14 million dollars more earnings in its petition.

AT&T, WU Get Interim OK Of Teletypewriter Rates

The FCC during the week of Nov. 24 authorized the American Telephone & Telegraph Co. and Western Union to increase private line teletypewriter (teleprinter) service charges by about 13.4 million dollars (TELEPHONY, Nov. 15).

The increased teleprinter charges had been scheduled to go into effect on Dec. 1, but the FCC ordered a one-day delay. This was to give the commission time to issue orders instructing both companies to keep strict accounts in case the increases later are refunded.

The teleprinter rate raises will result in an additional 8.4 million dollars in revenue for AT&T and for Western Union about 5 million dollars.

The commission previously had suspended higher proposed rate increases until Jan. 1. Later it permitted AT&T and Western Union to file new tariff proposals provided they did not exceed the suspended rate increases.

The increases were allowed to go into effect on an interim basis, pending completion of a long-range FCC study of private line rates and regulations. The increases could be made permanent, increased or reduced at that time.

If foes of the increased charges should win their fight against them, the two companies would be required to issue refunds for the period they were in effect.

The increases had been protested by the American Newspaper Publishers Association, United Press International, the National Association of Broadcasters, the government's General Services Administration, the American Stock Exchange, three Trans-Lux News companies, and a score of other major users of teleprinter service.

Approve, Hear Rate Raise Petitions in Kansas

The Kansas Corporation Commission authorized a $5,061 annual rate increase for Telephone Service Co. Inc., Mullinville, it was reported on Nov. 27 (TELEPHONY, Sept. 20).

The rates will become effective after

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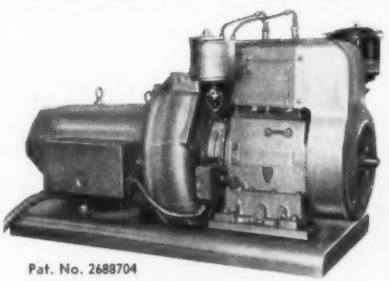
DROOP
DROP
or
BREAK

AMAZING U.S.
MICRO-POWER



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SENSES...

. . . the slightest drop in voltage. Actually *anticipates* power failure BEFORE voltage drops below a usable level.

ACTS...

. . . automatically to guarantee absolutely uninterrupted power. Not one precious second lost in load transfers.

SAVES...

. . . UP TO $300 PER MILE on new Micro Wave installations. Just one compact Micro-Power Unit replaces a costly array of complicated equipment.

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Take all your outdoor measurements this modern, time saving way. ROLATAPE reduces the risk of human error, since it records precise measurements in feet as it is rolled along—automatically and in full view of the operator. Sturdy, lightweight; equipped with automatic brake and built-in stand. Handle folds compactly.

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Santa Monica, Calif.
Send me free details on ROLATAPE:
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the Mullinville exchange has been converted to dial service. The exchange serves 244 subscribers.

The commission set a Jan. 15 hearing date on an application by S & T Cooperative Association, Brewster, to increase its rates at Brewster, Levant, and Kanorado.

Four General of S.W. Texas Exchanges Get Raises

The following rate increases became effective in Texas exchanges of General Telephone Co. of the Southwest during October.

Aransas Pass, conversion to automatic, 2,304 stations, Oct. 22:

	Old	*New*
One-party business	$8.00	$10.50
Two-party business	7.00	8.50
One-party residence	4.25	5.00
Two-party residence	3.50	4.25
Four-party residence	3.25	3.75

Tivoli, conversion to automatic, 101 stations, Oct. 1:

One-party business	6.50	8.50
Two-party business	5.25	7.00
One-party residence	4.00	4.75
Two-party residence	3.50	4.00

Three Rivers, CB, manual, 589 stations, Oct. 26:

One-party business	7.75	10.00
Two-party business	6.00	8.00
One-party residence	3.85	5.00
Two-party residence	3.00	4.50
Four-party residence	2.50	4.00

Gustine, magneto, 189 stations, Oct. 21:

One-party business	5.50	8.50
One-party residence	3.50	4.50
Four-party residence	3.00	3.25

Canadian Cabinet Permits Bell Rate Increase

The Canadian cabinet during the week of Nov. 24, decided to permit the Bell Telephone Co. of Canada to charge higher rates (TELEPHONY, Nov. 1).

New rates will produce an increase in revenues of 17.5 million dollars annually. Some 46 municipalities in Ontario and Quebec had protested to the cabinet about the rate raise the company sought.

The new rate increase applies only to the main provinces of Quebec and Ontario in which the Bell Telephone Co. of Canada operates.

As a result of the cabinet decision old and new rates are as follows for Toronto:

	Old	*New*
One-party residence	$ 5.45	$ 5.85
Two-party residence	4.25	4.50
One-party business	15.60	17.25

A new charge of 10 cents, for station-to-station collect calls or charges to third-party telephones will be assessed.

Bashlin Quality
FOR OVER 30 YEARS
CHOICE OF EXPERIENCE
1. BASHLIN Quality Tool Buckets . . . (Built to Last Longer) The original Fibre Top Buckets
2. Good, Tough Buckskin Work Gloves
3. BASHLIN Quality Boots and Footwear
4. BASHLIN Quality One Piece Steel and Adjustable Aluminum Climbers with Replaceable Gaffs
5. BASHLIN Body Belts with additional Nylon Safety Feature
6. BASHLIN Leather and Nylon Safety Straps

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IN CANADA: A. B. Chance Co. of Canada Ltd. Toronto

Ask for . . .

CATALOG NO. 156

W. M. BASHLIN CO.
GROVE CITY, PA.

New ROHN
SELF SUPPORTING
COMMUNICATION TOWER

★ 120 ft. in height, fully self-supporting!
★ Rated a true HEAVY-DUTY steel tower, suitable for communication purposes, such as radio, telephone, broadcasting, etc.
★ Complete hot-dipped galvanizing after fabrication.
★ Low in cost—does your job with BIG savings—yet has excellent construction and unexcelled design! Easily shipped and quickly installed.

FREE *details gladly sent on request. Representatives coast-to-coast.*

ROHN *Manufacturing Co.*
116 Limestone, Bellevue, Peoria, Illinois

"Pioneer Manufacturers of Towers of All Kinds"

The increase granted by the board, of 5 per cent of telephone revenues in 1957—the first raise since 1952—gave the company the full amount it requested.

Neb. Company Seeks Purchase Loan OK's; Asks to End EAS

The Nebraska Railway Commission on Dec. 5 was to have heard the application of the Glenwood Telephone Membership Corp., Blue Hill, to purchase the Lawrence Telephone Co., and the Kearney County Independent Telephone Co., Norman.

Authority is also being asked to negotiate a $1,035,000 REA loan to finance the purchase.

Also asked is permission to discontinue extended area service between Glenwood's Blue Hill, Rosemont and Cowles exchanges; Roseland, Holstein and Bladen exchanges, Bladen, Roseland, Holstein and the Campbell exchange of the Campbell Telephone Co.; and Campbell, Roseland, Holstein, Rosemont and Cowles.

Communication Equipment Exports Rise 50 Per Cent

A growing export market for telecommunications equipment has brought an increase in this trade of more than 50 per cent in the past six years.

The Commerce Department's Business & Defense Services Administration reported on Nov. 24 that exports rose to $46,913,632 at the end of 1957, and could top 70 million dollars by 1967.

Telephone equipment and supplies are responsible for 75 per cent of the business, and telegraph equipment the remainder. Two factors — modernization of facilities and expanded usage—enter into the increased trade.

Canada is the principal U.S. market for both telephone and telegraph equipment sales, but BDSA reports that many countries are in the midst of an improvement and expansion program for communications spurred by bettered economic conditions.

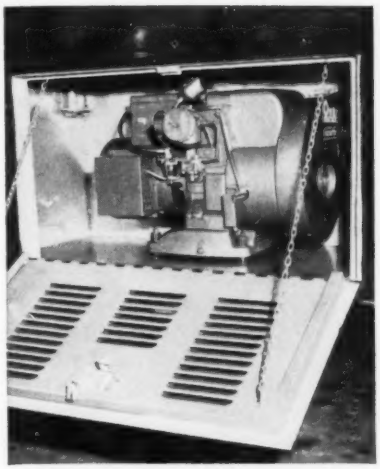
Three in Wis. Ask Raises

The Wisconsin Public Service Commission on Dec. 5 was to have heard the rate raise petitions of the following three companies: Annaton Preston Telephone Co., Montfort; Grant County Telephone Co., Livingston; and Rewey Mineral Point Telephone Co., Rewey. These three companies are all managed by Earl Murray.

Show Appreciation

"We let our blessings get mouldy, and then call them curses."—BEECHER.

ELECTRIC PLANT
NEWS



Charges truck batteries at far less cost... provides A.C. power, too!

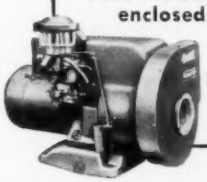
Before the dual-purpose Onan Electric Plant was installed on this maintenance truck, it was necessary to run the 160 H.P. truck engine to charge batteries for communications. Now, the 2 H.P. Onan Electric Plant does the same job . . . saving fuel and engine maintenance.

These battery charging-A.C. combination electric plants are available with 1,000 or 2,000 watts of A.C. output for operating tools and lights. Either size also delivers a full 30 amperes . . . enough to handle battery drain from radio and lighting.

Big savings reported!

One utility makes fuel savings alone estimated at $2.00 per day per truck. Another cites an annual saving of $800.00 per truck. This is based on battery charging output only. In addition, the A.C. output makes possible replacing hand tools with electric tools . . . saving time and money.

Vacu-Flo cooling permits enclosed installations



Vacu-Flo cooling is a low-cost optional feature on Onan air-cooled plants up to 10,000 watts.

Other Onan Models 500 to 200,000 watts A.C., D.C. and Battery Charging.

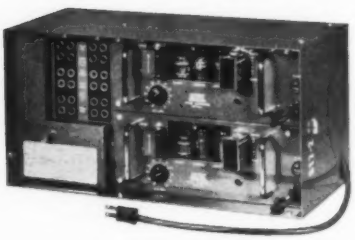
Write for folder showing 3 Packaged Power Systems

Onan ELECTRIC PLANTS

D.W. ONAN & SONS, INC.
3840A University Ave. S.E., Minneapolis 14, Minn.

NEW!

FROM ALTEC



ALTEC S-17B Program Amplifier System

THE ONLY PROGRAM AMPLIFIER SYSTEM

providing in one frame: Two amplifiers that can be used together or independently. Two line equalizers, adjustable without strapping. Two jack fields—for easier testing, equalizing, monitoring. Self-contained power supply.

Portable or rack-mounted, this easy-to-install, time and money-saving unit replaces up to 10 separate pieces of equipment. The new S-17B provides broadcast quality wide range program channels for radio, FM, TV and wired music. Plug-in amplifiers are easy to inspect, repair or replace.

Thoroughly field tested—60 were used to broadcast the Pasadena Rose Parade and the Rose Bowl Game.

Weight: 44 pounds.

Output Power: +24 dbm.

Distortion: not over ½% THD (30-15,000 CPS at +24 dbm).

Gain: at least 44 db; adjustable to minimum of 8 db.

Equiv. input noise: —115 dbm.

Input impedance (internal): 150/600 ohms ±5%, 30 to 15,000 cps.

Output impedance (internal): 150/600 ohms ±5%, 30 to 15,000 cps.

Longitudinal balance of input circuit and output circuit with 600 ohm connection:
55 to 60 db at 40 and 15,000 CPS
70 db at 1000 CPS

For complete information about ALTEC telephone and paging equipment call Graybar.

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ALTEC LANSING CORPORATION

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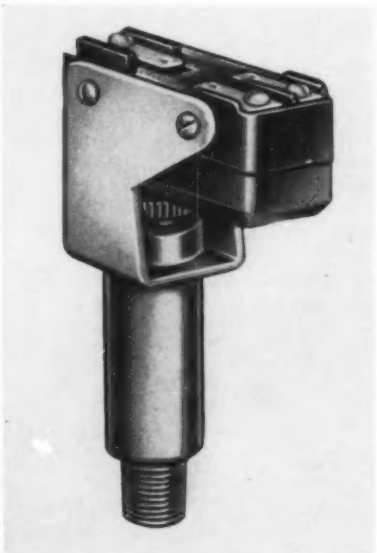
1515 S. Manchester Ave., Anaheim, Calif.
161 Sixth Ave., New York 13, N.Y. 12TP

News on New Products

CLOSE-DIFFERENTIAL PRESSURE CONTROL—United Electric Controls Co. is announcing the addition of five new models to their light-weight pressure control style J40. These additional models are specifically designed with phosphor bronze bellows allowing the user to obtain differentials as close as 12±4 ounces.



The company states the new models, like the others, are rugged, precision-built units suitable for air, gas or liquid pressures and because of their light weight, only 3½ ounces, are excellent for applications where space and weight are important factors.

Pressure settings on these skeleton units are uncalibrated and are made by rotating a knurled adjustment wheel.

The addition of five new models, brings the total to 12 in this particular type of pressure control and extends the range of pressures from 0—350 psi. The bellows material comes in three types: brass, monel and the new phosphor bronze.

Snap-action switches, normally closed, open or double-throw, may be used with a standard electrical rating of 15 amps at 115/230 volts ac. However, the switch differentials may be increased or reduced considerably by controlling electrical rating. Request NP986.

■

LIGHT HAULING AND DELIVERY VEHICLE—A "beefed up" model of the 780 (gasoline-powered) Truckster, incorporating according to the company, no less than a dozen major improvements, and a new heavy-duty electric Truckster head the 1959 line of light hauling and delivery vehicles produced by Cushman Motors.

Capable of handling 800-pound payloads at an operating cost of less than a penny per mile, the 780 Truckster is used in industrial, commercial, agricultural, and governmental applications. Powered by a 7.95-horsepower Cushman Husky four-cycle, high compression engine, the Truckster has (as differentiated from Cushman chain-driven scooters) automotive-type clutch, transmission and differential, the company states. It will travel at speeds up to 50 miles per hour.

(Please turn to page 106)

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP986_____; NP987_____; NP988_____; NP989_____;
NP990_____; NP991_____; NP992_____; NP993_____;
NP994_____; NP995_____.

Name.....Title.....

Company.....

Street.....

Town and State.....

12/6/58

NEW

JOINS 26% FASTER

Because there are no separate couplings to assemble on the job, Orangeburg's new CA Conduit lays faster—costs less to install. In addition, there are no coupling cartons to handle, transport or store.

Orangeburg's new CA Conduit comes, at *no extra cost*, with a factory-attached coupling at one end and a standard 2° male taper at the other end. To join—CA's long, lightweight lengths are placed end to end—hammered home in a simple, one-step operation. Actual installations *prove* Orangeburg's new CA Conduit joins up to 26% faster!

What's more, because the attached coupling is *flush* with the outside diameter of the conduit, new CA Conduit is easy to handle and store in neat, even stacks. And with the new flush coupling there's no need to "stagger" conduit joints in the trench. That means less cutting and tooling time.

New CA Conduit—like the millions of feet of Orangeburg Fibre Conduit in use since 1893—has self-sealing joints and impermeable walls that make it absolutely watertight. Its smooth 100% fibre raceway adds years to cable life.

Specify new CA Conduit on your next job. This addition to Orangeburg's line is available in 2", 3", 4", 4½" and 5" sizes. Orangeburg's Standard and Nocrete Conduit with separate sleeve couplings are available as always. Orangeburg Manufacturing Co., Inc., Orangeburg, N. Y. and Newark, Calif.

Orangeburg Fibre Conduit is distributed by Graybar Electric Co. and General Electric Supply Co. with branches and stocks in principal cities.

. . . keeping pace

You're right in step with *Lenkurt* . . . the answer to your 'growing needs!'

LENKURT offers these dependable, revenue producing systems designed with expansion in mind.

THIN-ROUTE CARRIER-ON-RADIO SYSTEM...Lenkurt Type 911 communications package combines narrow-band FM radio with 45CX or 33B carrier to provide 1 to 8 voice channels. This system is ideally suited for toll quality circuits to branch offices and remote areas, and for emergency or seasonal resort traffic.

MOBILTEL...a real answer to areas 'raring to grow.' Rural subscribers who have been beyond practical reach can now receive full telephone service at home and on the road. And with Lenkurt Mobiltel you are assured the finest in mobile telephone communications...'telephone engineered from dashboard to switchboard.'

FM SUBSCRIBER LINE CARRIER...solves your rural expansion problems the most economical way. Up to 10 multi-party circuits can be added on an existing wire pair. Hundreds of these systems, built for Lenkurt by Panhandle, are providing dependable subscriber service for the nation's leading telephone companies.

WIRELINE TOLL CARRIER...permits your present wires to carry more revenue. With Lenkurt 33A or 45C open-wire carrier you can start with a single channel and add more as your toll requirements grow. Installation, maintenance and expansion are easy with a Lenkurt integrated carrier package; easy on the budget, too.

Don't delay. Ask for facts and figures today. Call your Automatic Electric representative or mail this coupon for complete system descriptions.

Automatic Electric Sales Corporation • Northlake, Illinois (*Attn. T. B. Collins*)

Please send literature on:

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- ☐ *Lenkurt Mobiltel*
- ☐ *FM Subscriber-Line Carrier*
- ☐ *Lenkurt 33A & 45C Carrier*
- ☐ *Have representative contact us*

Name.....**Title**.....

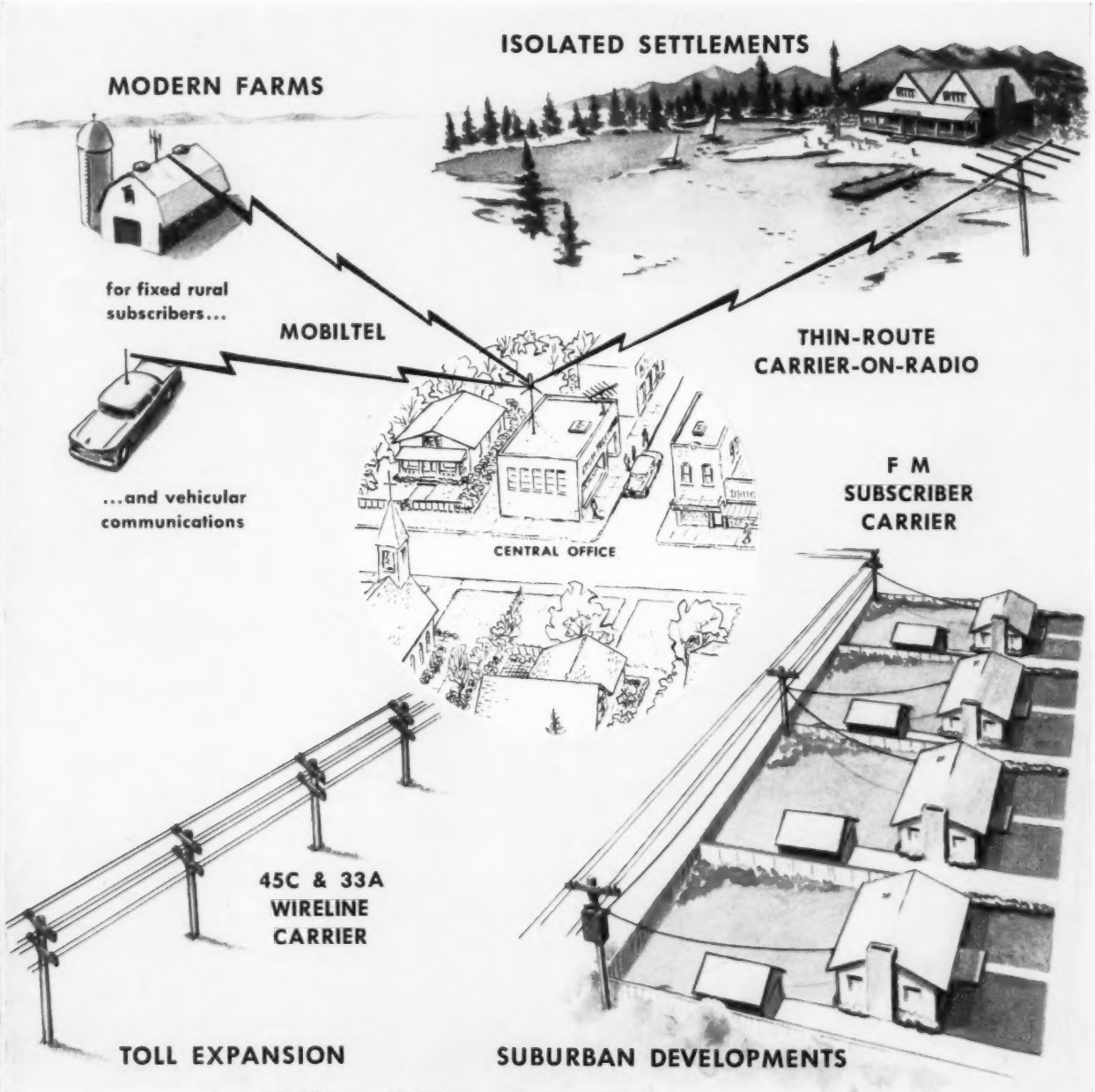
Company.....

Address.....

City.....**Zone**.....**State**.....

In Canada: **Automatic Electric Sales (Canada) Ltd.**
185 Bartley Drive, Toronto 16, Ontario

with this growth?



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It's SIMPLE
SAFE
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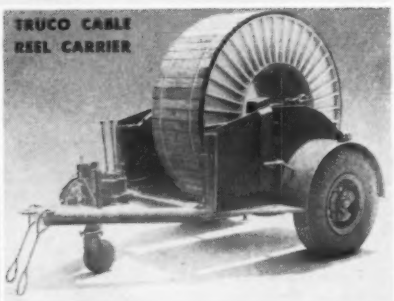
Now...at half the cost...you can get this safe, insulated, well-designed aerial lift.

Counterbalanced for moving ride ...Collapses short...mounts on smallest truck...Simple, foolproof controls at basket...Fiberglass insulated.

the TRUCO Aerial Lift

TRUCO AERIAL LADDER


TRUCO CABLE REEL CARRIER

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Truco
For details write
TRUCK Equipment COMPANY
3963 Walnut Street • Denver 5, Colorado

Major improvements in the 780 Truckster include a new constant mesh transmission; a new clutch; internal expanding, hydraulic brakes on all three wheels; tapered roller bearings in all three wheels; a heavy duty 12-volt magneto for lighting; a sealed beam headlight; heavy duty, automotive-type wheel rims; and independently operated parking brakes. In electric starting models, battery charging is now provided by a selenium rectifier.

Offered in a wide variety of body styles to meet specific needs, the 780 Truckster also is available with fiber glass cab and side curtains for weather protection.

The new heavy duty electric Truckster (model 734) is capable of handling a 1000-pound payload plus operator and passenger. Its 45⅝-x-61½-inch flat bed can be equipped with stake racks. Powered with a choice of lead-acid or Edison type batteries, it will travel up to 50 miles without recharging, Cushman announces. Equipped with automotive-type steering wheel, it is maneuverable and will operate in 50-inch passageways. It has two forward speeds, 6 and 10 miles per hour, and one reverse speed, 6 miles per hour.

Two other electric Trucksters are offered: The model 730, a single passenger machine with 2-cubic-foot carrier space; and the model 731, a two-passenger machine with quarter-ton payload rating. Request NP987.

•

CENTRIFUGAL PUMPS—Three new pumps, the "300" series, have just been announced by Homelite, a division of Textron Inc. These new 3-inch self-priming, centrifugal pumps, with capacities of 18,000 gallons per hour, were specifically designed for all-pur-

what a line...

CF&I GALVANIZED STEEL STRAND

You can't always pick the terrain over which service wires must be strung—but you can select guy and messenger wires that will hold lines in spite of high wind, snow and ice loading.

For long, trouble-free service, choose CF&I Galvanized Steel Strand. It is made of steel with exactly the right chemical and physical properties to assure high strength and easy workability. It is carefully drawn, cleaned and galvanized with a tightly-bonded coat of pure zinc to produce a corrosion-resistant finish that won't flake or peel, even when severely bent.

CF&I Galvanized Steel Strand meets or exceeds ASTM Specifications A-122 or A-363, or can be made in seven- or three-wire constructions to meet your specifications. Your nearby CF&I representative or local electrical distributor can give you complete details. Call him today.

5904

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THE COLORADO FUEL AND IRON CORPORATION

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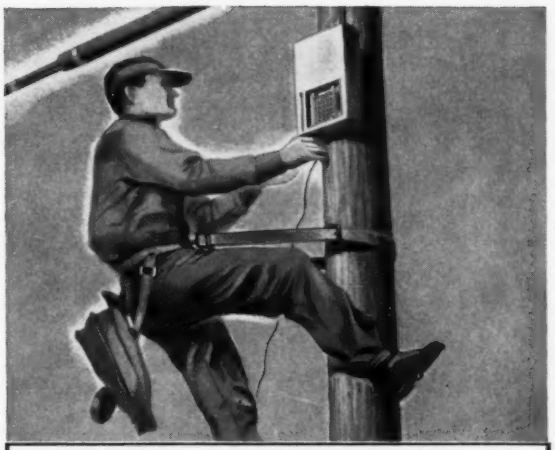

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...THE ONLY SELF-FUSING POLYETHYLENE TAPE... IS MADE BY BISHOP

Now...only ONE tape for ALL drop wire splices...replaces time-consuming splicing methods requiring two tapes.

BI-SEAL IS THE ONLY POLYETHYLENE TAPE THAT IS...

- Self-fusing under its own pressure.
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- Proof...years of operational experience indicate much longer weathering life.
- More protection than the original insulation.
- High dielectrical strength (approx. 1000V/mil). BI-SEAL conforms perfectly to the most complex shape.

For complete information see your telephone supply distributor or Write today for Free Catalog on BI-SEAL and other quality BISHOP tapes.

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MANUFACTURING CORPORATION
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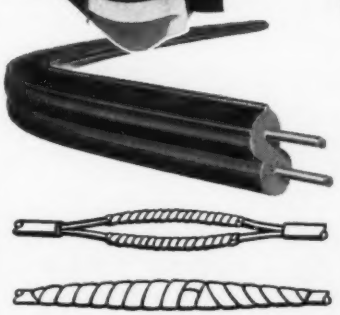
BISHOP...MORE THAN A CENTURY OF ELECTRICAL INSULATION

INDEPENDENT



PARALLEL DROP WIRE SPLICE

- Wrap with a single half-lapped layer of Bi-Seal Type 2A
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- Completed Splice
- Write for copies of Bi-Seal Splicing Methods, Specification BM-1

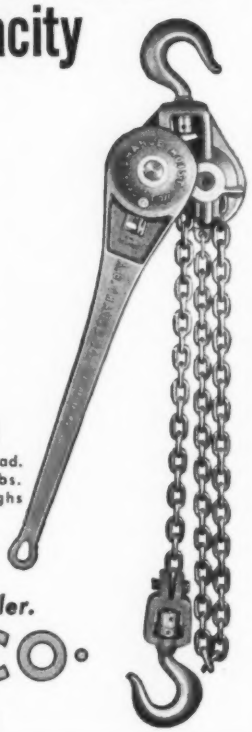
NOW...the "Lineman's Hoist" in a New TWO-TON Capacity

Now... a big brother to the popular Chance One-Ton Hoist... a Two-Ton Hoist with the same mechanical simplicity—plus precision gearing that doubles load capacity. Bigger, stronger, it has all the features linemen from coast to coast suggested in helping to develop the Chance One-Ton Hoist.

Easy-to-grip well-balanced handle operates from either side. "Free-wheeling" for ease in hooking to load. Automatic locking prevents accidental dropping of load. Chain won't bind or kink. Half or full link take up. Controls can be worked with gloves. 360° swivel hook with optional safety latch.

SAFETY LATCH HOOK
Optional at slight extra cost.

TWO-TON
Rated to lift a two-ton load. Proof-tested to 6000 lbs. before shipment. Weighs only 24 lbs.



Order from your line equipment wholesaler.

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GENERAL OFFICES: CENTRALIA, MO.
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CT58-8A

TAKE A BIG STEP TOWARD **SAFETY** *WITH* **DUO-SAFETY** *LADDERS*

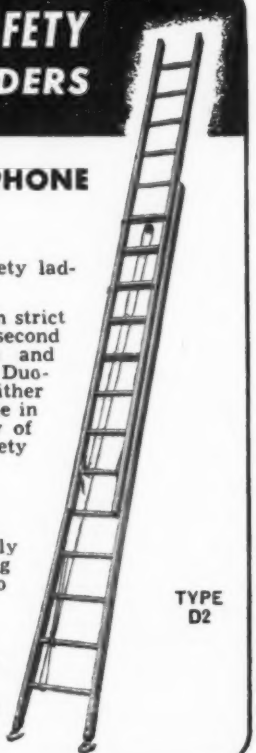
...CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

pose use by utilities, contractors, builders, construction men, municipalities and industrial plants.

Homelite states the "300" pumps are completely new in engine and pump design. The new model 8 engine starts quickly even in cold or wet weather.

Simple, rugged, two-cycle engine design has fewer moving parts and is easy and inexpensive to maintain, the company says. A new ceramic-coated seal, standard equipment on these units, lasts five times longer than cast iron-bronze seals on ordinary pumping jobs; 15 to 20 times longer under highly abrasive pumping conditions.

New impeller and volute designs result in fast self-priming, greater discharge pressures and high suction lift, the company reports. Self-cleaning construction permits handling of muddy and sandy water without clogging.

All three models are guaranteed to pump and prime at 28 feet above water level, Homelite announces.

The quiet, slow-speed, "300" Model 8S3-1 is designed for use in city and suburban areas and for emergency night operations where noise is a problem. This pump has a total head of 65 feet.

Where higher discharge pressures are required, the fast-priming, standard-speed "300" Model 8S3-1R pump is used. Total head is 125 feet.

Third in the "300" series is the high-volume, pressure pump, Model 8S3-1P, for jetting, fire fighting, irrigation and other jobs requiring high discharge pressures. It delivers 102 gallons per minute at 60 psi. Total head is 185 feet.

All three pumps, each weighing 103 pounds, can be carried to any pumping site easily, Homelite states. Manual throttle control allows the matching of pumping speeds to job requirements; high speed for quick de-watering, low speed for economical seepage control. Request NP988.

•

PARKWAY TERMINAL — Communication Equipment & Engineering Co.

"Golly...everybody's ordering Automatic's Transistorized Repeaters"

No wonder the young lady is amazed. Thousands of AT-2 and AT-3 transistorized repeaters were placed in service in the first year—and the orders keep piling in. Here's why:

These repeaters offer an easy, inexpensive way to raise transmission on trunks and long lines. When combined, they overcome up to 85% of the line loss, provide up to 14 dB gain. On existing circuits, you'll avoid costly cable-loading; on new circuits, you can avoid the use of heavier gauge wire.

There are other advantages you'll like too. Maintenance is far lower because transistors are used. No special power supply or cooling facilities are needed. And these repeaters are space-saving—8 mount side-by-side on a 19" rack.

Interested? Then write today for full details. Address:

Automatic Electric Sales Corporation, Northlake, Illinois.
Or call FIllmore 5-7111.

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Subsidiary of **GENERAL TELEPHONE**

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a Complete Program
To Train Telephone Technicians
Quickly, Easily, Economically!
BASIC FUNDAMENTALS AC-DC ELECTRICITY, ELECTRONICS, CARRIER THEORY AND OPERATION ADVANCED TELEPHONE CARRIER TECHNIQUES.
For Individuals or Company Classes
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Now, for the first time a practical, comprehensive training program developed in collaboration with major American telephone companies and equipment manufacturers and perfected in actual use by plant engineers and installation technicians. TTI fully qualifies you to install, operate and maintain telephone equipment.
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Please send me full information about TTI's unique training program.
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New "Lightweight"
PULLS ANY SIZE POLE EASIER!
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ALUMINUM
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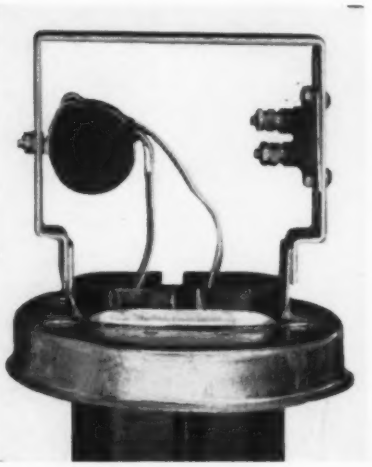
35 LBS. LIGHTER — WEIGHS ONLY 60 LBS.
The first time and labor saving improvement in pole jacking in 25 years! Aluminum housing saves 35 lbs. without sacrifice of strength or capacity. Pulls or straightens poles—pulls butts—moves loaded poles...without digging. Husky—to handle the toughest jobs. Same construction features as famous SIMPLEX No. 329 — the standard pole jack of the Bell Systems.
15-TON CAPACITY
22-IN. LIFT
Simplex
LEVER • SCREW • HYDRAULIC
Jacks
Write for Descriptive Bulletin
TEMPLETON, KENLY & COMPANY
2557 Gardner Rd. Broadview, Ill.

announces availability of its new Type LUG-3 Parkway Terminal for one, two or three-pair buried plastic wire, including space for 300-pair plastic cable.



The basic design gives ample room for loading, testing, splicing, cross-connecting and drop wire distribution, the company states. Four sizes of "bell jar" type hoods are interchangeable.

CEECO Type C152 ready-mount loading coil assemblies are available in from 1 to 28 coils. The C637 unit load coil assemblies may also be used.

Special non-protected terminal assemblies in one, two, six, 12 and 16-pair sizes can be mounted with a screw driver, CEECO says. All metal parts are of heavy galvanized steel.

Special pole-mounting brackets are available for aerial mounting. The company states it is possible to buy only what is needed, and add later according to requirements. Request NP989.

•

120-240 CHANNEL MICROWAVE SYSTEM—A new multichannel microwave relay system for common-carrier, industrial, and government services is announced by Raytheon Mfg. Co.

Operating in the 5925-8500-Mc band, the new model MCR-1000 accommodates 120 to 240 channels. Linear 1-Mc base-band response makes it suitable for voice, high-speed teleprinter, facsimile, supervisory control and telemetering, Raytheon states.

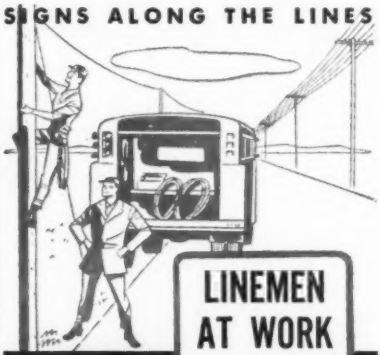
One-watt power output insures reliable transmission under all conditions, according to the company. Other reliability features include a ferrite waveguide switch for instantaneous switchover, a low-loading fault sensing and alarm system, and a service channel.

Silicon-diode rectifiers are used in the power supply, and a transistor inverter provides power for battery operation. Request NP990.

TELETYPEWRITER — Development of a teletypewriter, believed to be the fastest general purpose message printer in communications history and capable of typing at a rate of 3,000 words a minute, has been announced by the Department of the Army. The new de-

vice was developed jointly by the U. S. Army Signal Corps and the Burroughs Corp. It prints four full lines of text a second, which is 50 times faster than a news service teletypewriter, 45 times faster than an average typist, and 20 times faster than the average person can talk.

Operating at a lower speed of 750

SIGNS ALONG THE LINES

LINEMEN AT WORK
USING
Crapo GALVANIZED
GUY & MESSENGER STRAND
Positive strength and durability economies, combined with the superior qualities of steel, make Crapo Galvanized Steel Strand a rugged performer. The heavy, ductile, tightly-adherent galvanized coating — applied by the famous Crapo Process — provides dependable protection for the steel, prolongs the expectant life of the strand. There is a size and grade of Crapo Galvanized Strand for every practical need.
INDIANA
STEEL & WIRE COMPANY, INC.
Muncie, Indiana

PAGE WIRE

—now offers

ACCO *Aluminized*

Telephone Wire and Strand

Here are two new examples of PAGE'S pioneering leadership—the same kind of leadership that earlier was responsible for the development of Stainless Steel Strand, and was instrumental in developing Stainless Steel Lashing Wire:

1 • Our new ACCO *ALUMINIZED* Telephone Wire, combining the strength of steel with the corrosion-resistance of a bonded coating of aluminum. Available in these grades: Best Best (BB); Grade 85; Grade 135; Grade 190 (Support Wire) and Steel Construction Wire.

2 • Our new ACCO *ALUMINIZED* Steel Strand, also with a bonded coating of corrosion-resisting aluminum. Made in 3-, 7- and 19-wire construction. Available in Common, Siemens-Martin, High Strength, Extra High Strength and Utility grades.

We consider the unique aluminized coating of these wires to be superior to Class C galvanizing—in longer service life under virtually all conditions. Yet, with all their advantages, you can buy them at *much lower prices!*

For full details, *see your Telephone Supply Distributor —or write our Monessen, Pennsylvania, office.*

Page Steel and Wire Division
AMERICAN CHAIN & CABLE

ACCO

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IT'S AS SIMPLE AS ADDING ONE PLUS ONE! Kennecott lead-alloy sheathed Telephone Cable gives dependable, long-lasting service because of superior manufacturing techniques, *plus* rigid quality tests. For example, Kennecott's *exclusive* "Young Process" produces lead sheath, virtually free from oxides and impurities. Tests *prove* that this lead sheath is stronger—has a much higher life expectancy than ordinary lead sheaths. Contact the Chase sales office near you for full details.

IT'S KENNECOTT TELEPHONE CABLE

INDEPENDENT

CHASE BRASS & COPPER CO., WATERBURY 20, CONN.
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KENNECOTT WIRE & CABLE CO.

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Boston	Dallas	Indianapolis	Newark	Pittsburgh	Seattle
Charlotte	Denver	Kansas City, Mo.	New York (Maspeth, L. I.)	Providence	Waterbury
Chicago	Detroit	Los Angeles		Rochester	

New Kellogg K-31 Carrier System

Ideal for Rural Subscribers

Kellogg's new K-31 rural subscriber carrier system provides telephone companies with toll quality subscriber carrier at low cost. The system is completely transistorized, features printed circuits, miniaturized sub-assemblies and plug-in construction.

Standby power, consisting of two small batteries and a transistorized charger in a pole-mounted housing, is available. This is possible because power consumption is less than three watts even during talking.

K-31 has built-in compandors to assure quiet talking circuits and is automatically regulated to eliminate the effect of changing weather conditions over a wide range of carrier line losses.

Line-up and test procedure is very simple—a single level control for each direction of transmission. Terminating telephone type jacks are provided for ease and speed in testing. Installation time is held to a minimum by the use of a unique pole-mounted housing with built-in protected terminal blocks for external connections.

These design features plus top quality components and workmanship make K-31 reliable and stable in its operation.

Ask your Kellogg sales representative for full details.

KELLOGG
CHICAGO, ILLINOIS

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois. Communications Division of International Telephone and Telegraph Corporation.
Regional Offices and Warehouses: See two-page Kellogg advertisement pages 6-7 for complete listing.

words a minute to meet Army Signal Corps requirements, the new electronic messenger will be the major unit in the Army's new family of teletypewriter devices, all operating at 750 words a minute, the Army announced. Together they make up the fastest known military teletypewriter network in the world, providing the increased message speed vital for modern atomic-age maneuvers.

The new Army teletypewriter has no ordinary keys. At 750 words a minute, they could barely get into the air or would jam up on the first word. Instead, letters are shot at the paper electronically by a bank of electrode "guns." Each aims its beam at a corresponding spot on the paper and can fire any letter or number.

After the volley of letters, each line of text passes rapidly over powdered ink and a heated roller, and appears a split second later as clear, readable text.

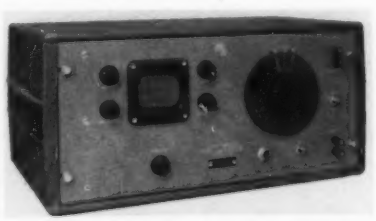
The machine operates from standard code tape, or can be plugged into long-distance radio or telephone circuits to print out messages sent from across the continent or overseas.

Another use of this unique printing technique, called "Electrostatic Recording" will be to type out the calculations of new military electronic "brains." These combat computers handle information so fast that none of today's standard page printers can keep up with them.

In mass production, the high-speed printer is expected to cost half as much as the bank of eight standard printers it can replace. The announcement also stated there are no moving parts, except for the paper transport, and that repair of the electronic circuits will be greatly simplified by the system's replaceable plug-in units. Request NP991.

•

ULTRA-SONIC PRIMARY PHASE STANDARD—Acton Laboratories, Inc., a subsidiary of Technology Instrument Corp., offers Type 706-A Ultra-sonic Primary Phase Standard. This instrument generates two sinusoidal voltage signals whose phase difference can be varied smoothly from 0° to 360° with an accuracy of 0.1°.



Units are built for any single frequency from 20 kc to 200 kc. The instrument can be used for calibrating high frequency phase meters and phase

detectors, and phase shifting devices in general.

Operation of the Type 706-A is based on the interpretation of a multiple-frequency Lissajous pattern. The output signal frequency is applied to the horizontal deflection plates of a cathode-ray oscilloscope. A signal whose frequency is exactly 36 times the output frequency is applied to the vertical plates.

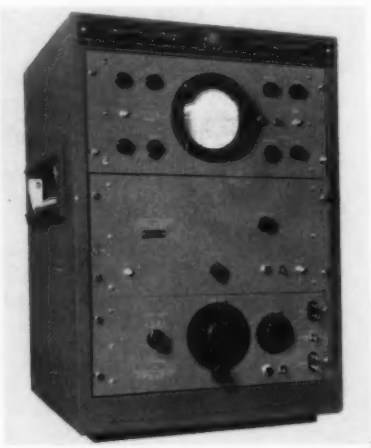
The resultant Lissajous pattern will rotate as the phase of the low frequency signal is varied.

With a frequency ratio n of 36, the pattern will repeat itself 2n times for every 360° shift of the low frequency voltage. Thus, the pattern is the same at every 5-degree phase interval (360°/2n=5°).

Calibration of the phase shifter section of the instrument removes the ambiguity caused by every 5-degree phase shift point presenting the same pattern on the scope, the company states. Between 5-degree points, a vernier phase shift dial is used to set incremental angles within ±0.1°. Note that accuracy is not dependent on the dial calibration, but results directly from the precision with which the Lissajous pattern is read, Acton Laboratories points out. Request NP992.

•

AUDIO PRIMARY PHASE STANDARD—Acton Laboratories Inc. also is introducing a new Type 7000-B Audio Primary Phase Standard. Features include ultimate accuracy of ±0.01°, self-calibration, Lissajous Pattern presentation and long-term operating reliability.



The Type 7000-B Audio Primary Phase Standard supplies two sinusoidal voltage signals whose phase relationship is known to ±0.05° and is continuously variable from 0° to 360°. The frequency of the two signals is the same and is set at one selected frequency

WHITNEY BLAKE

TELECORD®

SETS

IN COLOR

In colors to match all telephones and trimmed to fit all makes, Whitney Blake's famous TELECORD Sets are now available in hand set and line cords in lengths up to 25 feet. TELECORD, noted for the toughness of its jacket under adverse conditions, is the logical replacement cord. TELECORD, never frays and is highly resistant to abrasion, perspiration, humidity, oil and grease. Specify Whitney Blake Replacement Sets in black or colors when ordering from your independent telephone supply house.

INDEPENDENT

WB

10-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

MAGNOLIA
CHLOROTHENE
SAFE DRY CLEANER

NO FIRE HAZARD
EXTREMELY LOW TOXICITY
EXTRA HIGH SOLVENCY
RAPID DRY TIME

A safe effective substitute for Carbon Tetrachloride

- Chlorothene is an excellent solvent for cleaning metals contaminated with greases, oils, tars and waxes.
- Chlorothene is especially suitable for cold-cleaning, dip-cleaning and bucket-cleaning operations.
- Chlorothene does not corrode aluminum or aluminum alloys under ordinary conditions.
- Chlorothene is the answer to the search for a cold cleaning solvent that eliminates fire hazard that equals carbon "tet" in cleaning power and yet is only 1/20th as toxic. Chlorothene has no flash point—no fire point. Chlorothene permits cleaning of common metals, including aluminum with relative safety from corrosion.

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TELEPHONE INSULATORS

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Made of highest quality dry-process electrical porcelain . . . Porcelain Products' telephone insulators assure long, continuous service . . . customer satisfaction. Porcelain Products, Inc. has served the telephone industry for decades, offering a complete line of insulators that meet AT & T and REA specifications . . . simplifying installation . . . reducing maintenance. Write for complete information, today!

Porcelain Products, Inc.
CAREY, OHIO

from 30 cps to 20 kc, the company states.

The Type 7000-B is used for calibration of phase detectors and phase-shifting devices such as phase shift capacitors. It will measure the absolute phase shift and stability of amplifiers, transformers, and rotating electrical machinery.

If the operating frequency is selected so that a 1-degree phase shift represents a certain number of yards of range, the instrument can be used for highly-accurate calibration of sonar ranging systems, Acton Laboratories reports. Request NP993.

•

MICROWAVE ANTENNA SYSTEMS—Prodelin Inc. has announced the availability of complete microwave antenna systems featuring their newly developed semi-flexible Spir-O-line coaxial cable with a choice of 2, 4, 6, 8 or 10-foot-diameter spun aluminum parabolic antennas, or 4, 6, or 10-foot-diameter aluminum mesh antennas.

All antennas use broadband dipole feeds and are designed in accordance with recommendations developed under Specification RS-195.

Prodelin says the systems include all the hardware needed for assembly such as grounding straps, male-female ells, adaptors, cable grips, protective sleeves, wraplock, gas barriers, elbows, etc., and offer a choice of 50-ohm Spir-O-line coaxial cable in ½, ⅞, and 1⅝-inch diameters. Frequency bands between 1700 mc/s and 2200 mc/s may also be selected.

To help the engineer determine the antenna and cable sizes needed to achieve the required gain, Prodelin has made available a set of antenna gain charts.

Then, from Prodelin's illustrated "Microwave Antenna Systems" bulletin, the engineer can see at a glance and specify all the components he needs with what Prodelin describes as a simplified ordering code. Request NP994.

•

VOLT-OHM-MILLIAMMETER ANALYZER — Increased range and ruggedness in a smaller size are features of the all-new Weston Mark II Analyzer just introducted by Weston Instruments, Division of Daystrom, Inc.

Weston says the new thin-line Model 980, a highly sensitive and extremely sturdy volt-ohm-milliammeter, was engineered to provide for a wide range of test measurement applications in the electrical and electronic fields. It has a dc sensitivity of 20,000 ohms/volt, and an ac sensitivity of 1,000 ohms/volt. It offers accuracy within 2 per cent full scale dc and 3 per cent ac.

A CHRISTMAS GIFT
Headset Operators Will Appreciate and only $1.00

4 attractive Tele-Muff Jrs., in gift box, mailed to recipient with your name enclosed. Send money with order and we will ship in December or when you prefer.

TELE-MUFF CO.
Box 832
San Fernando, California

Stewart
TEST EQUIPMENT
COMMUNICATIONS TEST SET

MODEL JK

Transistor Oscillator, Communications D B Meter; Leather carrying Case.

Transistor Oscillator, Model J: For checking and locating trouble in audio frequency and carrier systems. Sine wave output 0, —12, —16 D B M 1,000 cycles into 600 ohm line. Output impedance 600 ohms. **Communications D B Meter,** Model K. Frequency band, 60 cycles to 600 K C with no correction. Reads accurately on unsymetrical and sine waves. D B M readings, —20 to +40 in RED; Volt ranges 0 to 1, 5, 25, and 125 in BLACK. Internal loads 600 and 150 ohms. **Leather Case,** 3 compartments for Testers and Leads. Either Model J or Model K may be purchased separately.

STEWART BROTHERS
Division of Instrument Laboratories
Chicago 10, Illinois

Range and function-switching is greatly simplified by use of a single dial control.

The Weston CORMAG mechanism protects the instrument against magnetic disturbances, and electrostatic shielding assures accurate measurements at high dc voltage. The company states fused ohmmeter circuits prevent burnout if voltages are mistakenly applied.

Physical protection is safeguarded by spring back jewels and a fully insulated crack-proof case, according to Weston. Other conveniences include a wide-angle scale and new four-way cover which also serves as a tilt stand.

Ranges provided by the new analyzer are:

DC Volts: 1.6, 8, 40, 160, 400, 800, 4000 . . . at 20,000 ohms/volt.
AC Volts: 1.6, 8, 40, 160, 400, 1600 . . . at 1,000 ohms/volt.
DB Range:—15 db to + 54 db (in six ranges).
DC Milliamperes: 1.6, 8, 80, 800.
DC Microamperes: 80.
DC Amperes: 8.

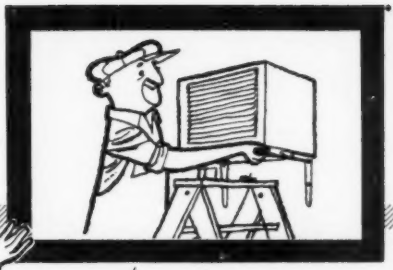
High voltage probes, which can measure voltage up to 20 kv at 50 microamperes or less are available. Request NP995.

Check Analysis Service Offered to Telephone Field

Availability of a free check analysis service for the telephone and telegraph industry primarily to help its members re-design their checks for electronic bank bookkeeping has been announced by the Todd Co. Division, Burroughs Corp., Rochester, N. Y.

The company stated the service will be provided by its new check analysis and design department, created to assist banks and commercial firms in re-de-

UP
IN A FLASH!



BUT—
DOWN
WITH A
CRASH!

Beware of inferior screw anchors
INSIST ON BRANDED RAWLPLUGS

Whenever you fasten fixtures to plaster, brick, construction block, or concrete, use time-tested Rawlplugs to put work up fast, put it up to last. Now they're branded with the name "RAWL"... look for it to make sure you get genuine Rawlplugs.

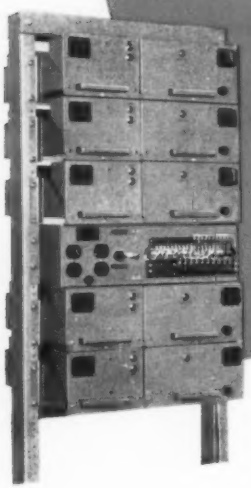
Your RAWL distributor has a complete stock of Rawlplugs, hand or power Rawldrills for masonry drilling, and a full line of other masonry anchoring products. To help you select the right masonry anchor for your job, he'll gladly give you your complimentary copy of the "Masonry Anchoring Handbook." Ask him for it or write us . . . it's free.

R-1

THE RAWLPLUG COMPANY, INC.
230 Petersville Road, New Rochelle, N. Y.

WHY DO SO MANY LARGE TELEPHONE COMPANIES STANDARDIZE ON...

LYNCH B-120 SUBSCRIBER CARRIER SYSTEMS ?



because....

B-120 gives the lowest circuit cost regardless of original equipment prices....

It will operate with any of the many types of signaling systems used in the U.S.A. — ring-trip, simultaneous revertive, superimposed.

Uses single sideband suppressed carrier transmission .....

Complete accessories and line treatment equipment available .....

lower operating frequencies mean that longer entrance cables can be used .....

Coordinates with standard toll carrier systems and can be used side-by-side with them on the same pole line or entrance cable.....

Has lowest maintenance cost of any similar equipment .....

Lynch TELEPHONE SYSTEMS

LYNCH CARRIER SYSTEMS INC.
SAN FRANCISCO, CALIF.

Distributed by GraybaR ELECTRIC COMPANY

CANADIAN DISTRIBUTORS Northern Electric COMPANY LIMITED

EXPORT... PHILIPS EXPORT COMPANY
DIVISION OF NORTH AMERICAN PHILIPS COMPANY INC.

signing their checks to meet the needs of the new electronic bookkeeping equipment already installed in hundreds of banks across the country and on order by hundreds more.

In addition to rating a check on its adaptability to electronic processing, the analysis chart to be forwarded by the department will also appraise it on 12 other points, including general efficiency, arrangement for accurate bank handling, advertising and public relations values, color, typography, general layout, and safeguards provided against alteration and forgery.

To take advantage of the service, companies should send a sample of the check or checks they use to the attention of the Check Analysis & Design Dept., Todd Co. Division, Burroughs Corp., P. O. Box 910, Rochester 3, N. Y. Check samples should be canceled by an all-zero checkwriter impression on the amount line.

Sierra Electronic Names Director of Engineering

Sidney Frankel has been appointed director of engineering of Sierra Electronic Corp., a subsidiary of Philco Corp. He succeeds Paul F. Byrne, who recently retired from full-time participation in the company's activities.

Mr. Frankel joins Sierra from the Hughes Aircraft Co. where he was senior staff scientist in the company's Airborne System Laboratory. He previously had served in administrative, engineering, and research positions with Litton Industries, International Telephone & Telegraph Corp., Eclipse Aviation Corp. and Warner Brothers Pictures Corp.

Superior Cable Appoints Glenn Assistant Secretary

James R. Glenn has been appointed assistant secretary of Superior Cable Corp., Hickory, N. C., R. Walker Geitner, president of the company, has announced.

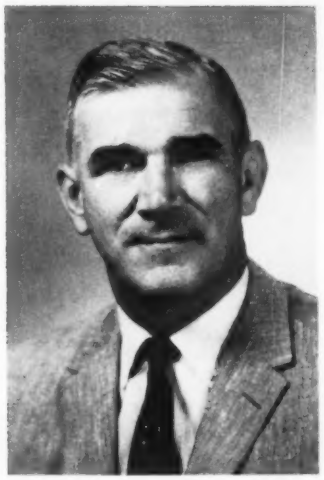
In addition to his new responsibilities, Mr. Glenn will continue to supervise the inside sales and cost estimating departments.

Mr. Glenn has been associated with Superior Cable since the early beginnings of the company.

Leich Names Boyd Dallas Warehouse Manager

John W. Boyd has recently been named manager of Leich's Dallas, Tex. supply warehouse, according to D. C. Gibson, president of Leich Sales Corp.

Mr. Boyd was formerly associated with North Electric Co. From 1954 to



J. W. BOYD

1958, he served as North's supply warehouse manager, also in Dallas. Prior to this, he was employed with the Oklahoma Automatic Telephone Co. for several years.

Leich's Dallas warehouse serves the Southwest. It stocks tools, hardware, booths, paystations, protection equipment, Electronic Secretary units, wire, and cable splicers' materials.

Western Electric To Build Crossbar Plant in Oklahoma

The Western Electric Co. announced on Nov. 13 that it will start construction work in December on its 35 million-dollar permanent plant, seven miles west of downtown Oklahoma City.

The company expects work at the site to get under way before Christmas. Grading for the 1,200,000-square-foot building is expected to be finished by early spring, with structural steel in place and masonry well along by the end of 1959.

The plant ultimately will employ approximately 4,000 people in production of "crossbar" automatic switching equipment. The local plant, plus a newly-finished plant in Omaha, Neb., and one soon to be completed in Columbus, O., will be the chief suppliers of this equipment to Bell companies.

Bell Scientist Knighted

Axel G. Jensen, director of visual and acoustics research at Bell Telephone Laboratories, has been made a Knight of the Order of Dannebrog by King Frederick IX of Denmark. The award was conferred on Mr. Jensen, in recognition of his work as a scientist, and as an expression of appreciation for his assistance to Danish scientists and engineers who have visited the United States.

ALPHADUCT DROP WIRE

carton packaging

saves you time and money

- easier to handle
- easier to inventory
- stacks neatly, saves space
- saves workmen from injury
- prevents wire from being crushed

Once you start using Alphaduct Drop Wire you will find out that the handy carton packaging has real dollars and cents advantages.

Not only does your wire arrive in perfect condition, but the sturdy carton protects it all the while it's in your warehouse.

The cartons are easier to handle than loose coils. They can be stacked higher without danger of falling and the wire on the bottom will not be crushed or bent. Space is saved, inventory taking is simplified, and the possibility of injuries to workers from tumbling coils is removed.

We try to make Alphaduct the finest, longest lasting drop wire money can buy. Quality materials are used throughout, step-testing during every phase of manufacture assures uniform high standards. Alphaduct drop wire is dated with a color coded thread so you can tell for sure how long it lasts.

Try Alphaduct Drop Wire

ALPHADUCT WIRE AND CABLE COMPANY • NEW BRUNSWICK, N. J.

NATIONAL DISTRIBUTORS • AUTOMATIC ELECTRIC SALES CORP., NORTHLAKE, ILL.
LEICH SALES CORPORATION, CHICAGO, ILLINOIS

REGIONAL DISTRIBUTORS • PANKEY SUPPLY CO., CHARLOTTESVILLE, VA.
THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO

Loading Coils (new) W.E.

96A Case equipped with 40 #644 (175 MH) coils, lead stub	$ 50.00
96A Case equipped with 50 #644 (175 MH) coils, lead stub	60.00
229A Case equipped with 152 #644 (175 MH) coils, lead stub	150.00
124A Case equipped with 10 #638 (44 MH) coils, lead stub	30.00
124B Case equipped with 26 #638 (44 MH) coils, lead stub	65.00

Phantom loading

204CG Case equipped with 12 SM11 units (88MH side, 50 MH ph)	$100.00
108B Case equipped with 16 MF11 units (88MH side, 50 MH ph)	125.00

C-114A

For field wire or Rural Distribution loading

(load the pair you want where you want) 5000-6000 ft. spacing light-weight plastic (1½ lbs.) may be supported by pair it loads 3"x3½"x4½" hinged lid and wire slots rubber gasketed to keep out moisture—special terminals to accommodate field wire. Will double talking range on twisted pair wire & cable.

C-114A (Signal Corps) contains one #632 (88MH) coil, potted $2.00
(632 coil may be melted out for repotting in larger case)

Phantom coil mounting (For pole or crossarm)

complete with 2 #C-161 repeating coils (Signal Corps moisture-proof version of W.E. 77A) and W.E. #84A, 5 pair protector with #26 & #30 discharge blocks. Heavy galv. metal with cover (wires enter at bottom).

Also available with W.E. #76A or #75A rep. coils (same price) $15.00
(mountings sold only with coils)

Repeating Coils (new)

W.E. 77A (substitute) C-161	$ 3.50
76A (two coils) 1:1 rat.	5.00
75A (better matched)	6.00
91A (double coil)	10.00
93A, B, F, G	12.50
70A ring-thru	5.00
27A non-ring-thru	3.00
25A two of above	5.00
94E non-ring-thru	2.50
94G	3.50
94H	5.00
101A	5.00
120C, CS, E, ES	5.00
Retard coils, 149E	3.00

(many other W.E. coils)

TELEPHONES (completely reconditioned)

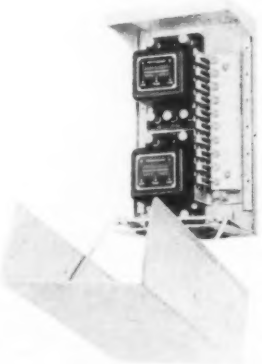
Western Electric #302 with F-1 handset, 5-H dial. Ringers: St. line, Synchromonic 16, 30, 42, 54, 66 cycle—Ready for service —immediate delivery $12.50

#302, as above, equipped with F-4 handset with T-1 transmitter —U-1 receiver (500 type) $15.00

#302, as above, but blanked for dial (F-1) $10.00

A.E. type 40, St. line, 16, 30, 42, 54, 66 cycle ringers, with #24 or later type dial (fully reconditioned) $12.50

(coiled handset cords, add 50 cents)



Coil Mounting

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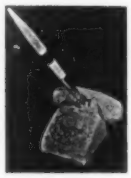

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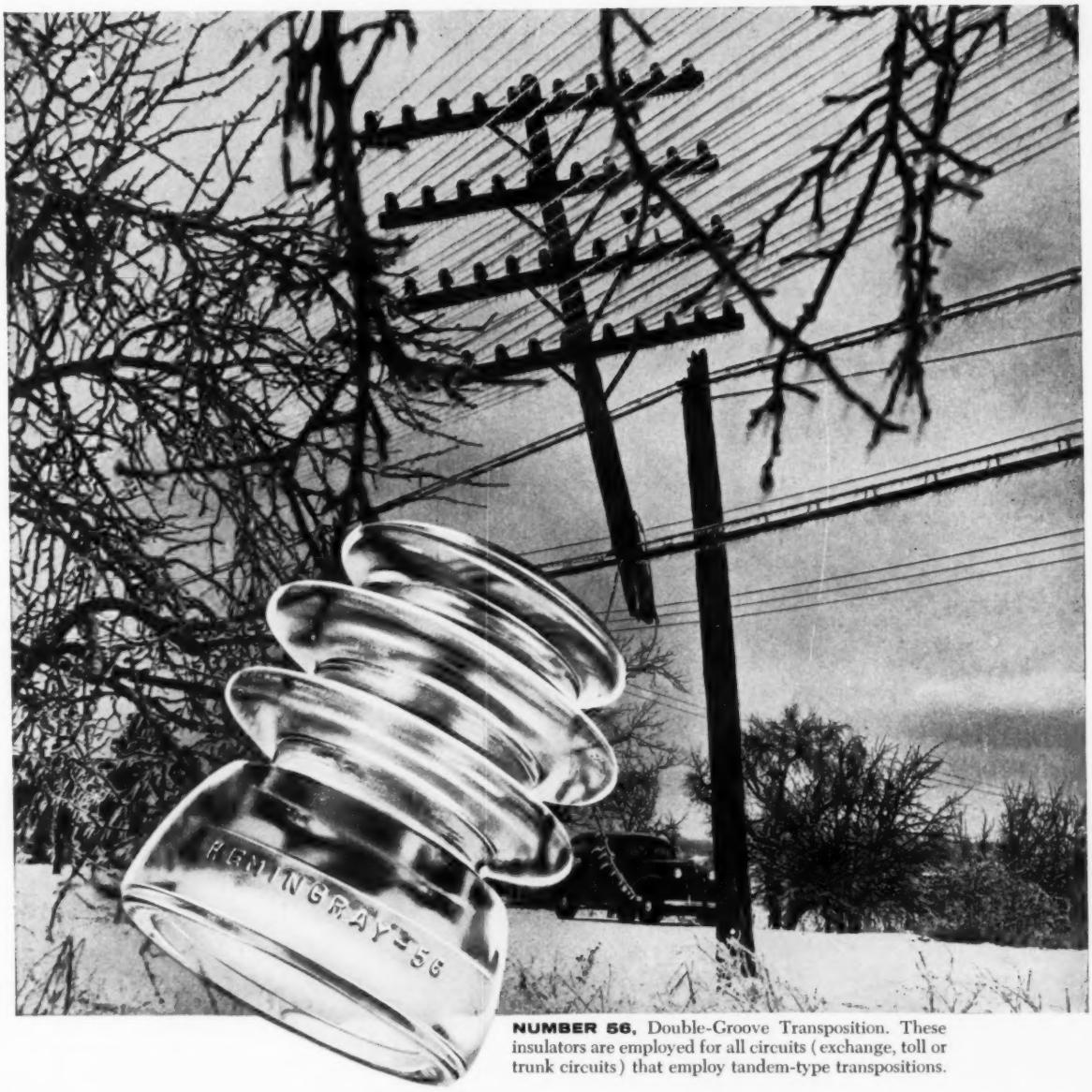

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